

Dell® Latitude® XPi CD

SERVICE MANUAL



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Read This First

A prerequisite for using this manual to service Dell portable computers is a basic knowledge of IBM[®]-compatible PCs and prior training in IBM-compatible PC troubleshooting techniques. In addition to information provided in this manual, Dell provides the *Reference and Troubleshooting Guide* for troubleshooting procedures and instructions on using the Dell diagnostics to test portable computers, and the online *System User's Guide* for information about system setup and operations.

Warnings, Cautions, and Notes

Throughout this manual, there may be blocks of text printed in bold type or in italic type. These blocks are warnings, cautions, and notes, and they are used as follows:

WARNING: A WARNING indicates the potential for bodily harm and provides instructions for how to avoid the problem.

CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and provides instructions for how to avoid the problem.

NOTE: A NOTE provides helpful information about using the computer system.

Chapter 1

System Overview

The Dell® Latitude® XPi CD is a lightweight, expandable portable computer that use the Intel® Pentium® microprocessor. This chapter provides an overview of the features and technical specifications of this computer.

System Features

In addition to the standard features found in a Dell portable computer, the Dell Latitude XPi CD models include the following new features:

- 64-bit-wide data bus.
- 60-MHz local bus and a 30-MHz PCI bus.
- 256-KB pipelined-burst SRAM secondary cache.
- 16 MB of nonremovable, EDO-type memory built in to the system board. Memory can be increased up to 48 MB by installing combinations of 8- and 16-MB fast-page memory modules in the two memory sockets on the system board.
- 128-bit accelerated graphics adapter with 1.1 MB of integrated video memory. The integrated video adapter is attached to the PCI bus.
- Full multimedia capability through the following standard features:
 - A built-in CD-ROM drive
 - MPEG software
 - Hardware wavetable support
 - SoundBlasterPro-compatible voice and music functions
 - Jacks for connecting external speakers, headphones, or a microphone
- Two infrared ports that compatible with the Infrared Data Association (IrDA) Standard 1.1 (Fast IR) for use with external devices.
- Keyboard with sound and Microsoft® Windows® operating system support.
- Support for two 3.3-V or 5-V PC Cards that adhere to the standards of the Personal Computer Memory Card International Association (PCMCIA). The computer supports type I, type II, or type III cards (in any combination).

For a complete list of system features, see “Technical Specifications” found later in this chapter.

Physical Description

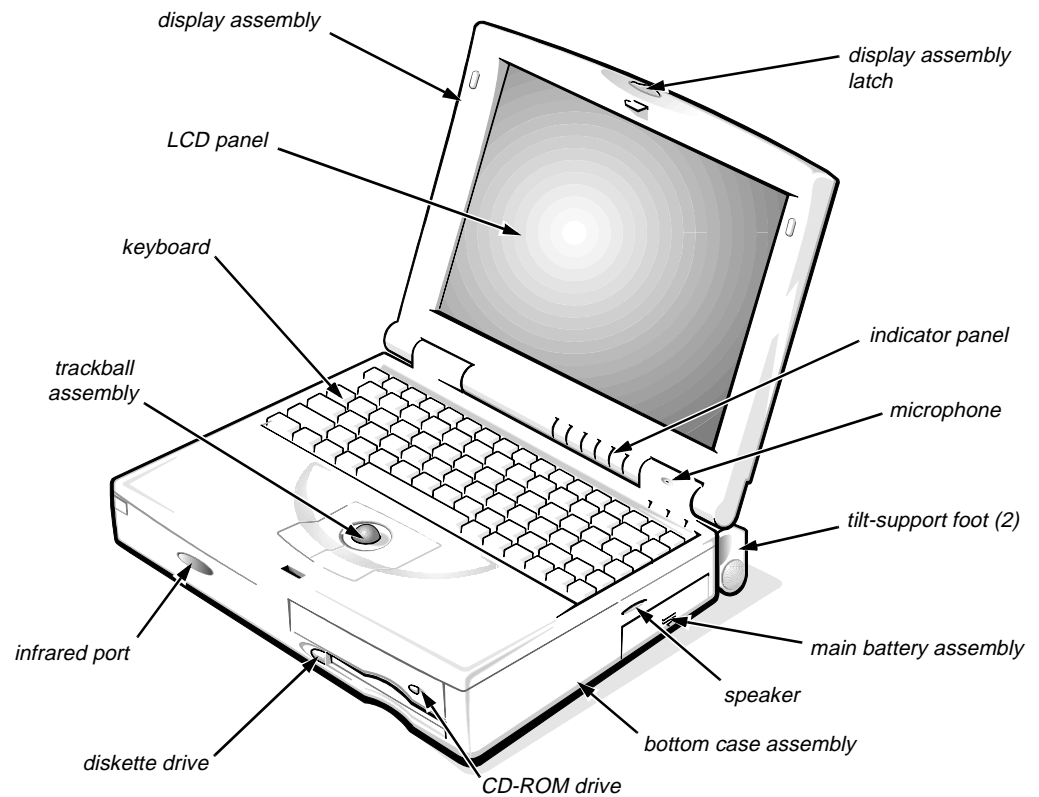


Figure 1-1. Front View of the Notebook Computer

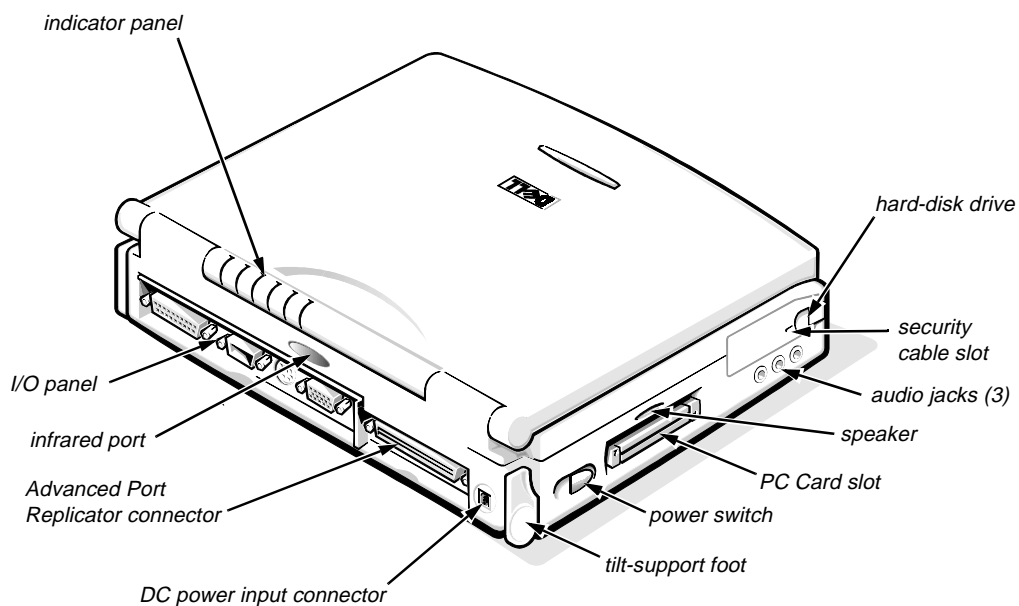


Figure 1-2. Back View of the Notebook Computer

Indicator Panel

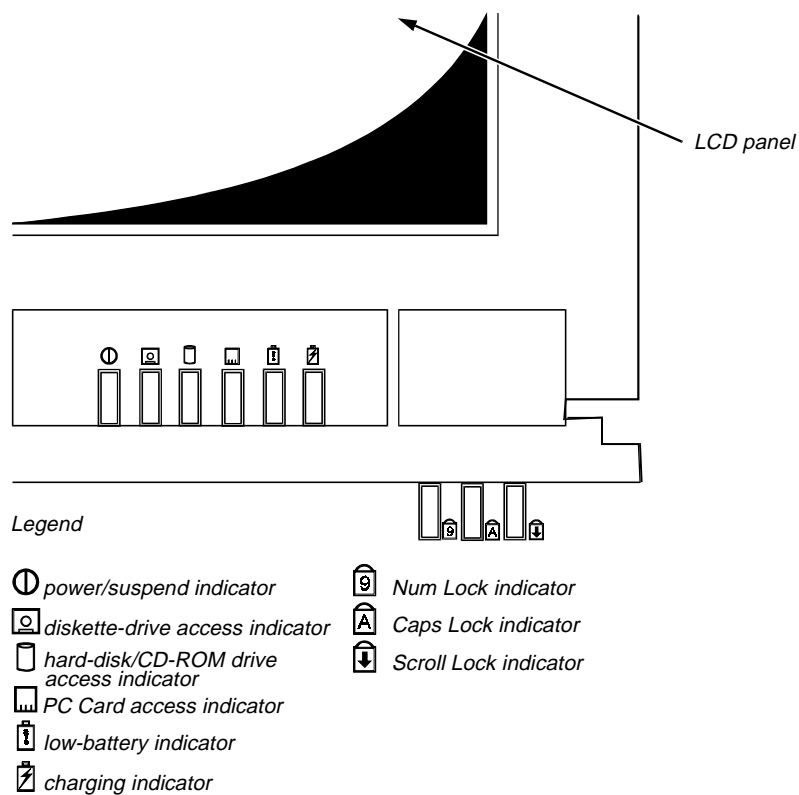


Figure 1-3. Indicator Panel

The portable computer has nine indicators: six on the display assembly's indicator panel and three on the keyboard assembly. Each of the six indicators on the display assembly has an identical pair of LEDs: one is visible on the indicator panel when the display is open, and the other is visible through an aperture on the outside of the display assembly when the display is fully closed. The subsections that follow describe the functions of the indicators.

Power/Suspend Indicator

The power/suspend indicator is a green LED. After the computer is turned on, the power/suspend indicator lights up constantly to indicate that the computer is receiving stable power. When the computer enters suspend mode, the indicator blinks once approximately every 8 seconds.

Diskette-Drive Access Indicator

The diskette-drive access indicator is a green LED. The indicator lights when data is being transferred to or from the diskette drive.

Hard-Disk/CD-ROM Drive Access Indicator

The hard-disk/CD-ROM drive access indicator is a green LED. The indicator lights when data is being transferred to or from the hard-disk drive or the CD-ROM.

PC Card Access Indicator

The PC Card access indicator is a green LED. The indicator lights when data is being transferred to or from an installed PC Card (also known as a *PCMCIA card*).

Low-Battery Indicator

The low-battery indicator is an amber LED. This indicator is used in conjunction with the speaker to indicate either of the following low-battery conditions:

- The first low-battery warning occurs when the main battery's charge has been depleted to 8 percent of its fully charged condition. The low-battery indicator turns on and the speaker emits five beeps.
- The second and final low-battery warning occurs when the main battery's charge has been depleted to 3 percent of its fully charged condition. The speaker beeps twice every 1 to 2 seconds for 15 seconds; then the system does a suspend-to-disk operation automatically before shutting down.

Charging Indicator

The charging indicator is an amber LED. The indicator turns on when the main battery begins charging and blinks to show the battery is fully charged.

Keyboard Indicators

The keyboard controls the operation of the numeric lock (Num Lock) indicator, the capitals lock (Caps Lock) indicator, and the Scroll Lock indicator, all of which are visible through apertures at the top of the keyboard. These indicators are associated with the <NUM LOCK> key, the <CAPS LOCK> key, and the <SCROLL LOCK> key; when lit, the LEDs indicate the active state of these keys.

Controlling Computer Power

The power button does not directly control power to the computer. Instead, when you slide the power button toward the front of the computer and then release it, the button momentarily closes the power switch on the system board. The power switch sends a signal to the power management controller, signaling the controller to initiate a change of state of the computer's power. The resulting power state depends on the present power state. The following subsection gives a description of the power states.

Power States

Sliding the power button toward the front of the computer initiates a change from the current power state to a different state. The protocols for the power state changes are as follows:

- If the computer is off (no indicators on) and the display is open and/or an external monitor is attached to the computer, sliding the power button initiates a boot operation.
- If the computer is off, if the display is closed, and if no external monitor is attached, sliding the power button causes the computer to run the POST and then turn off.
- If the computer is on and the **SYSTEM SWITCH** option in System Setup is set to **ON/OFF**, sliding the power button turns off the computer.
- If the computer is on and the **SYSTEM SWITCH** option in System Setup is set to **S2D/RFD**, sliding the power button causes the computer to enter suspend-to-disk mode.
- If the computer is in suspend mode (the power/suspend indicator flashes every 8 seconds), if the **SYSTEM SWITCH** option in System Setup is set to **ON/OFF**, and if the display is open or an external monitor is attached, sliding the power button turns off the computer.
- If the computer is in suspend mode (the power/suspend indicator flashes every 8 seconds), if the **SYSTEM SWITCH** option in System Setup is set to **S2D/RFD**, and if the display is open or an external monitor is attached, sliding the power button causes the computer to enter suspend-to-disk mode.

- If the computer is in suspend mode (the power/suspend indicator flashes every 8 seconds), if the display is closed, and if no external monitor is attached, sliding the power button has no effect on the power state. The computer remains in suspend mode.
- If the computer is in suspend-to-disk mode, sliding the power button causes the computer to initiate the resume-from-disk operation.

Interrupt Assignments

Table 1-1. Interrupt Assignments

IRQ Line	Used/Available
IRQ0	Generated by the system timer
IRQ1	Generated by the keyboard controller to signal that the keyboard output buffer is full
IRQ2	Generated internally by the interrupt controller to enable IRQ8 through IRQ15
IRQ3	Available for use by a PC Card unless the built-in serial port or infrared port is configured for COM2 (the default)
IRQ4	Available for use by a PC Card unless the built-in serial port is configured for COM1 (the default)
IRQ5	Available for use by the audio controller
IRQ6	Generated by the diskette drive controller to indicate that the diskette drive requires the attention of the microprocessor
IRQ7	Available for use by a PC Card or audio controller if the built-in parallel port is disabled
IRQ8	Generated by the system I/O controller's RTC
IRQ9	Available for use by the PC Card interrupt controller or the audio controller
IRQ10	Available for use by a PC Card or audio controller unless the Advanced Port Replicator is attached
IRQ11	Available for use by a PC Card unless the Advanced Port Replicator is attached
IRQ12	Generated by the keyboard controller to indicate that the output buffer of the integrated trackball or external PS/2 mouse is full
IRQ13	Reserved for use by the internal coprocessor
IRQ14	Generated by the hard-disk drive to indicate that the drive requires the attention of the microprocessor
IRQ15	Reserved for the CD-ROM drive

Technical Specifications

Table 1-2. Technical Specifications

Microprocessor	
Microprocessor type	Intel Pentium microprocessor
Microprocessor speed	150 MHz
Bus architecture	PCI
Internal cache memory	16 KB
External cache memory	256 KB pipelined-burst SRAM
Math coprocessor	internal to the microprocessor
Chip Set and Bus	
System chip set	Pico Power Vesuvius-LS Core Logic
Microprocessor data bus width . . .	64 bits
DRAM bus width	64 bits
Address bus width	32 bits
Security EEPROM	256 bytes
Flash EPROM	256 KB
Local bus	60 MHz
PCI bus	30 MHz
PC Card	
PC Card controller	Texas Instruments PCI1130 CardBus controller
PC Card connectors	two (supports type I and type II cards in any combination; type III cards can be used only with type I or type II cards)
Cards supported	3.3-V and 5-V
PC Card connector size	68 pins
Data width (maximum)	32 bits
Memory	
Architecture	EDO memory ¹
Memory module sockets	two

¹ The system supports fast-page-mode memory modules for memory upgrades.

Table 1-2. Technical Specifications (Continued)

Memory (Continued)	
Memory module type and capacities	8- and 16-MB fast-page mode
Standard RAM	16 MB (EDO) on system board
Maximum RAM	48 MB
Memory access time:	
tRAC	70 ns
tCAC	20 ns
BIOS address	F000:0000
Connectors	
Serial (DTE)	one 9-pin connector; 16550-compatible, 16-byte buffer
Parallel	one 25-hole connector; unidirectional, bidirectional, EPP 1.9, or ECP
Monitor	one 15-hole connector
PS/2	one 6-pin mini-DIN (this connector does not support more than one device at a time)
Infrared	two ports compatible with IrDA Standard 1.1 (Fast IR)
Audio	microphone-in line-in/audio-in headphones/speakers
Advanced Port Replicator	200-pin connector
Audio	
Audio type	SoundBlasterPro-compatible 3.01 voice and music functions
Audio controller	ES1888 ES690 wavetable music synthesizer, ES938 3D audio spatializer
Stereo conversion	16 bit (analog-to-digital and digital-to-analog)
FM music synthesizer	20-voice, 72-operator

Table 1-2. Technical Specifications (Continued)

Audio (Continued)	
Interfaces:	
Internal	ISA bus
External	stereo line-in minijack microphone-in minijack headphones/speakers-out minijack
Speakers	four 8-ohm speakers
Internal speaker amplifier	1 W into 8 ohms stereo
Headphones amplifier	150 mW into 32 ohms stereo
Controls.	volume can be controlled through key combinations, software application menus, or the Speaker window in the Dell Control Center
Video	
Video type	hardware-accelerated, 128-bit PCI
Video controller	NeoMagic 2090
Integrated video memory	1.1 MB
Display	
Type.	active-matrix color (TFT)
Dimensions:	
Height	195.0 mm (7.68 inches)
Width.	272.0 mm (10.7 inches)
Diagonal	307.5 mm (12.1 inches)
Maximum resolution.	800 x 600 pixels; 65,536 colors
Response time (typical)	80 ms
Operating angle.	0° (closed) to 180°
Dot pitch	0.31 mm
Power consumption:	
Panel (typical).	0.69 W
Backlight.	2.10 W
Controls.	brightness can be controlled through a key combination, the Display window in the Dell Control Center, or the System Setup program

Table 1-2. Technical Specifications (Continued)

Keyboard	
Number of keys	85 (U.S., Canada, Korea, Thailand, and locations that use traditional Chinese); 86 (Europe); 87 (Japan)
Key travel	3.0 ± 0.5 mm (0.12 ± 0.02 inch)
Key spacing	18.25 mm (0.72 inch)
Layout.	QWERTY, AZERTY, Kanji
Battery	
Type	lithium ion
Dimensions:	
Height	20.5 mm (0.81 inch)
Depth	152.75 mm (6.01 inches)
Width	78.5 mm (3.09 inches)
Weight.	0.41 kg (0.9 lb)
Voltage	14.4 VDC
Capacity	36 WH
Charge time (approximate): ²	
Computer on	2.5 hours
Computer off	1.5 hours
Operating time (approximate, with no power management features enabled) ²	
	2 to 3.5 hours (without a CD-ROM drive in use)
Life span (approximate) ²	400 discharge/charge cycles
Temperature range:	
Charge	10° to 40°C (50° to 104°F)
Discharge	10° to 40°C (50° to 104°F)
Storage	–40° to 65°C (–40° to 149°F)

² Battery performance features such as charge time, operating time, and life span can vary according to the conditions under which the computer and battery are used.

Table 1-2. Technical Specifications (Continued)

Battery (Continued)	
NiCad reserve battery:	
Voltage	7.2 V
Operating time (approximate)	2 minutes (if computer is in battery swap mode); 40 days (if power is turned off)
AC Adapter	
Input voltage	90 to 135 VAC and 164 to 264 VAC
Input current (maximum)	1.2 A and 0.6 A
Input frequency	47 to 63 Hz
Output current	4.5 A (maximum); 3.5 A (continuous)
Rated output voltage	18.5 VDC
Height	27.94 mm (1.1 inches)
Width.	58.42 mm (2.3 inches)
Depth.	133.35 mm (5.25 inches)
Weight (with cables)	0.4 kg (0.89 lb)
Temperature range:	
Operating	0° to 40°C (32° to 104°F)
Storage	-40° to 70°C (-40° to 158°F)
CD-ROM Drive³	
Disc size	8 cm and 12 cm (no adapter required)
Data transfer rate:	
Sustained	900 KB/sec (mode 2 disc)
Burst	14.4 MB/sec (PIO mode 3)
Seek time:	
Random	200 m/sec
Full-stroke	500 m/sec

³ The CD-ROM drive in your computer may have different specifications.

Table 1-2. Technical Specifications (Continued)

CD-ROM Drive ³ (Continued)	
Access time:	
Random	250 m/sec
Full-stroke	550 m/sec
Memory buffer	128 KB
Physical (Computer)	
Height	63.0 mm (2.48 inches)
Width	280.9 mm (11.06 inches)
Depth	233.5 mm (9.19 inches)
Weight (with battery and hard-disk drive)	3.29 kg (7.26 lb)
Environmental	
Temperature:	
Operating	10° to 40°C (50° to 104°F)
Storage	-40° to 65°C (-40° to 149°F)
Relative humidity (maximum):	
Operating	90% (noncondensing)
Storage	95% (noncondensing)
Maximum vibration:	
Operating	0.51 GRMS, using a random-vibration spectrum that simulates truck shipment
Storage	1.1 GRMS, using a random-vibration spectrum that simulates air/truck shipment

³ The CD-ROM drive in your computer may have different specifications.

Table 1-2. Technical Specifications *(Continued)*

Environmental <i>(Continued)</i>	
Maximum shock: ⁴	
Operating	152.4 cm/sec (60 inches/sec) (less than or equal to a pulse width of 2 ms)
Storage	203.2 cm/sec (80 inches/sec) (less than or equal to a pulse width of 2 ms)
Altitude (maximum):	
Operating	3048 m (10,000 ft)
Storage	10,600 m (35,000 ft)

⁴ Measured with the hard-disk drive in head-parked position.

Chapter 2

Initial Procedures

This chapter describes initial procedures that can help you diagnose a computer problem. These procedures can often reveal the source of a problem or indicate the correct starting point for troubleshooting the computer. Dell recommends that you perform these procedures in the order they are presented in this manual.

Initial User Contact

When you first contact a user who has a computer problem, ask the user to describe the problem and the conditions under which it occurs. A verbal description can often indicate the cause of a problem or indicate the appropriate troubleshooting procedure to use. After the user describes the problem, follow these steps:

- 1. Ask the user to back up any data on the hard-disk drive if the system's condition permits.**

See “Maintaining Your Computer” in the online *System User's Guide*.

- 2. Ask the user to try to duplicate the problem by repeating the operations he or she was performing at the time the problem occurred.**

Can the user duplicate the problem?

Yes. Proceed to step 3.

No. Proceed to the next section, “Visual Inspection.”

- 3. Observe the user to determine whether he or she is making an error, such as typing an incorrect key combination or entering a command incorrectly.**

Is the problem a result of user error?

Yes. Instruct the user in the proper procedure, or direct him or her to the appropriate user documentation for a description of the correct procedure.

No. Proceed to the next section, “Visual Inspection.”

Visual Inspection

The visual inspection consists of a quick inspection of the exterior of the computer and any attached peripherals, including making any necessary corrections. For information about the proper removal and installation of computer

components, as instructed in the following procedures, see Chapter 4, “Removing and Replacing Parts.”

CAUTION: Before you proceed with the visual inspection, ensure that the user has saved all open files and exited all open application programs if possible.

To perform a visual inspection, follow these steps:

- 1. Turn off any attached peripherals.**
- 2. Determine the present power state of the computer.**

Look at the indicators to determine which of the following conditions apply, and then turn off the computer, taking the actions listed for that condition:

- Power/suspend indicator is blinking approximately every 8 seconds — The computer is in suspend mode. Open the display and press any key to return the computer to the power-on state. If the computer does not turn on, press <FN> to return from battery-swap mode. Then slide the power button to turn off the computer.
- Low-battery indicator is on or blinking — A low-battery warning occurred; open the display and slide the power button to turn off the computer.
- Low-battery and charging indicators are both blinking — A defective battery is detected or the computer is too warm; slide the power button to turn off the computer.
- All indicators remain off — The computer is already turned off or is in suspend-to-disk mode.

- 3. Verify that the exterior of the computer is free of any obvious physical damage.**
- 4. If the computer is operating from an AC adapter, verify the following:**
 - The AC adapter’s AC power cable is connected to the AC adapter and the power source.
 - The AC adapter’s DC power cable is properly connected to the computer’s DC power input connector.
 - The AC adapter and cables are free of any obvious physical damage.

*NOTE: If the charging indicator and low-battery indicator flash **continuously** while the computer is connected to AC power, disconnect the computer from AC power and move it to a cooler location. When the computer has cooled to room temperature, reconnect it to AC power and continue charging the battery. If the computer is not allowed to cool, the battery stops charging before it reaches full capacity.*

- 5. If the computer is operating from battery power, remove the main battery assembly, verify that it is free of any obvious physical damage, and then reinsert the battery assembly into its compartment.**
- 6. Turn off the computer. Remove the hard-disk drive, verify that it is free of any obvious physical damage, and then reinsert the drive into its compartment.**
- 7. Remove any installed PC Cards from the PC Card slot, verify that they are free of any obvious physical damage, and then reinsert the card(s) into the PC Card slot.**
- 8. Remove any memory modules from the memory compartment, verify that they are free of any obvious damage, and then reinstall the memory modules.**
- 9. Open the display assembly, and verify that it is free of any obvious physical damage.**
- 10. Verify that the internal keyboard is free of any obvious physical damage and that its keys operate freely.**
- 11. Verify that the trackball and its associated switches operate freely.**
- 12. If an external monitor is connected, verify the following:**
 - The monitor's interface cable is properly attached to the VGA connector on the I/O panel.
 - The monitor's power cable is attached to a power source and is free of any obvious physical damage.
 - The monitor's controls are set according to the instructions in the documentation for the monitor.
 - The monitor and its interface cable are free of any obvious physical damage.
- 13. If an external mouse is connected, verify the following:**
 - The mouse is properly connected to the keyboard/keypad/mouse connector on the computer's I/O panel.
 - The mouse and its cable are free of any obvious physical damage.
 - The mouse's ball and push buttons operate freely.
- 14. For any attached serial or parallel devices, verify the following:**
 - The device's interface cable connector is correctly attached to the appropriate port connector on the computer's I/O panel.
 - The captive screws that secure the connectors at each end of the interface cable are secure enough to ensure a firm connection.
 - The attached device and its interface cable are free of any obvious physical damage.

15. Turn on any attached peripherals and then the computer.

Does the problem reoccur?

Yes. Proceed to the next procedure, “Observing the Boot Routine.”

No. No further steps are necessary.

Observing the Boot Routine

After you perform a visual inspection as described in the previous section, boot the computer from a diagnostics diskette and, while the boot routine is running, observe the computer for any indications of problems.

NOTE: To prevent possible damage to the original diagnostics diskette, always use a backup copy of the diagnostics diskette when servicing a user's computer. Dell recommends that users make copies of the Dell diagnostics diskette. For instructions, see “Before You Start Testing” in Chapter 4 of the Reference and Troubleshooting Guide.

To observe the boot routine, follow these steps:

- 1. Turn off the computer and any attached peripherals.**
- 2. Insert a diagnostics diskette into the diskette drive. Turn on all peripherals and then the computer.**
- 3. Watch the indicators on the top of the keyboard. After all three indicators flash momentarily, the Num Lock indicator should light up and remain on.**

Do these indicators light up within approximately 10 seconds after the boot routine starts?

Yes. Proceed to step 4.

No. Troubleshoot the power subsystem.

- 4. While the boot routine is running, observe the computer for any of the following:**

- Diskette-drive and hard-disk drive access indicators — These indicators light in response to data being transferred to or from the drives. If either of these indicators fail to light during the boot routine, troubleshoot the diskette-drive or hard-disk drive subsystem, as appropriate.
- Beep codes — A beep code is a series of beeps that indicates an error condition. If the computer emits a beep code, go to Table 3-1.

NOTE: The computer beeps once during the boot routine. This single beep is normal and is not a beep code.

- System error messages — These messages can indicate problems or provide status information. If a system error message displays, go to Table 3-2.

5. Observe the display for the Diagnostics Menu.

Does the Diagnostics Menu display?

Yes. See “Running the Dell Diagnostics” in Chapter 3.

No. Proceed to step 6.

6. Insert another copy of the diagnostics diskette into the diskette drive, and reboot the computer.

Does the Diagnostics Menu display?

Yes. See “Running the Dell Diagnostics” in Chapter 3.

No. Proceed to the next section, “Eliminating Resource Conflicts.”

Eliminating Resource Conflicts

Devices within the computer may require dedicated memory spaces, interrupt levels, or DMA channels, all of which must be allocated during installation of the devices. Because a device may be installed at a different time, it is possible that the same resource is assigned to two or more devices.

Resource conflicts can result in disorderly or erratic computer operation or failure of the computer to operate at all. If you suspect that resource conflicts might exist, check the computer and reassign the resources as necessary.

For more information about resolving conflicts, see Chapter 3, “Troubleshooting Your Computer,” in the *Reference and Troubleshooting Guide*.

Getting Help

If none of the procedures in this chapter reveal the source of the problem or lead to the proper troubleshooting steps for determining the source of the problem, call Dell for technical assistance. For instructions, see Chapter 5, “Getting Help,” in the *Reference and Troubleshooting Guide*.

Chapter 3

Beep Codes and Error Messages

This chapter describes beep codes and system error messages that can occur during computer start-up or, in the case of some failures, during normal computer operation. The tables in this chapter list faults that can cause a beep code or system error message to occur and the probable causes of the fault in each case.

If a faulty computer does not emit beep codes or display system error messages to indicate a failure, use the Dell diagnostics to help isolate the source of the problem. See “Running the Dell Diagnostics” found later in this chapter.

POST Beep Codes

If the display cannot display error messages during the POST, the computer may emit a series of beeps that identifies the problem or that can help you identify a faulty component or assembly. The following table lists the beep codes that may be generated during POST. Most beep codes indicate a fatal error that requires replacement of the system board or other corrective actions before the computer can operate.

Table 3-1. POST Beep Codes

Beep Code	Error	Probable Causes
1-1-3	NVRAM write/read failure	BIOS corrupted; system board faulty
1-1-4	ROM BIOS checksum failure	BIOS corrupted; system board faulty
1-2-1	Programmable interval timer failure	System board faulty
1-2-2	DMA initialization failure	System board faulty
1-2-3	DMA page register write/read failure	System board faulty
1-3-1 through 2-4-4	Installed memory module(s) not being properly identified or used	Memory module improperly seated or system memory controller faulty (system board faulty)

Table 3-1. POST Beep Codes (Continued)

Beep Code	Error	Probable Causes
3-1-1	Slave DMA register failure	System board faulty
3-1-2	Master DMA register failure	
3-1-3	Master interrupt mask register failure	System board faulty
3-1-4	Slave interrupt mask register failure	
3-2-4	Keyboard controller test failure	Keyboard assembly faulty or system board faulty
3-3-4	Display memory test failure	System board faulty
3-4-1	Display initialization failure	
3-4-2	Display retrace test failure	
4-2-1	No timer tick	System board faulty
4-2-2	Shutdown failure	
4-2-3	Gate A20 failure	
4-2-4	Unexpected interrupt in protected mode	
4-3-1	Memory failure above address 0FFFFh	Memory module improperly seated or system memory controller faulty (system board faulty)
4-3-3	Timer chip counter 2 failure	System board faulty
4-3-4	Time-of-day clock stopped	Reserve battery faulty or system board faulty
4-4-1	Serial port failure	System board faulty
4-4-2	Parallel port test failure	System board faulty
4-4-3	Math coprocessor failure	System board faulty

Table 3-1. POST Beep Codes (Continued)

Beep Code	Error	Probable Causes
5-1-1	System power-management interrupt initialization failure	System board faulty
5-1-2	BIOS shadowing failure	
5-1-3	Video BIOS shadowing failure	
5-2-1	Keyboard controller download failure	
5-2-2	CPU stepping failure	
5-2-3	System board failure	
5-2-4	Setup decompression and shadowing failure	

System Error Messages

The following table lists (in alphabetical order) system error messages that may appear on the display during the boot routine or during normal computer operation.

Table 3-2. System Error Messages

Message	Definition	Probable Causes
Auxiliary device failure	Integrated trackball or external PS/2 mouse failed.	Integrated trackball or external PS/2 mouse faulty.
Bad command or File Name	Command entered does not exist or is not in pathname specified.	Bad command or filename entered.
Cache disabled due to failure	Microprocessor's internal cache memory failed.	System board faulty.
Data error	Diskette or hard-disk drive cannot read the data.	Faulty diskette/tape drive subsystem or hard-disk drive subsystem.

Table 3-2. System Error Messages (Continued)

Message	Definition	Probable Causes
Decreasing available memory	Informational message indicating memory is failing (usually preceded by memory error message).	One or more DIMMs faulty or improperly seated.
Disk C: failed initialization	Hard-disk drive failed to initialize.	Hard-disk drive data in System Setup does not match installed hard-disk drive, or hard-disk drive faulty. System files missing or corrupted.
Diskette drive 0 seek failure	System cannot read diskette in diskette drive.	Diskette faulty or incorrectly inserted in drive.
Diskette read failure		System Setup contains incorrect settings. Diskette drive interface loose or faulty. Diskette drive faulty.
Diskette subsystem reset failed	Diskette subsystem failed to respond to reset command from computer.	System board faulty.
Diskette write-protected	Diskette is write-protected, operation cannot be completed.	Diskette write-protected.
Drive not ready	The diskette may be missing from or improperly installed in the diskette drive.	Defective or unformatted diskette.
Error reading PCMCIA card	Computer cannot identify PC Card.	PC Card faulty, improperly seated, or improperly configured. System board faulty. PC Card software faulty or incorrectly installed.

Table 3-2. System Error Messages (Continued)

Message	Definition	Probable Causes
Extended memory size has changed	Amount of memory recorded in NVRAM not matching memory installed in computer.	One or more memory module(s) faulty or improperly seated.
Gate A20 failure	Computer cannot enable protective mode.	One or more memory module(s) faulty or improperly seated.
		System board faulty.
General failure	Message indicates system failure.	Operating system unable to carry out the command.
Hard-disk drive configuration error	Computer cannot identify hard-disk drive type.	Installed hard-disk drive not compatible with computer.
Hard-disk drive controller failure 0	Hard-disk drive or controller not responding to commands from computer.	System board faulty.
Hard-disk drive controller failure 0	The CD-ROM drive does not respond to commands from the computer.	System board faulty.
Hard-disk drive failure	Hard-disk drive not responding to commands from computer.	Computer needs rebooting.
Hard-disk drive read failure		Hard-disk drive faulty.
Invalid configuration information – please run System Setup program	System Setup contains invalid settings.	Incorrect settings in System Setup.
		Reserve battery weak or depleted.
Keyboard controller failure	Keyboard controller not responding.	Cable or connector loose, or keyboard faulty.
Keyboard clock line failure	Keyboard not responding.	Cable or connector loose, or keyboard faulty.
Keyboard data line failure		

Table 3-2. System Error Messages (Continued)

Message	Definition	Probable Causes
Keyboard stuck key failure	Keyboard key(s) jammed.	For external keyboard or keypad, cable or connector loose or keyboard faulty. For built-in keyboard, keyboard faulty. For either keyboard, key may have been pressed while computer was booting.
Memory address line failure at <i>address</i> , read <i>value</i> expecting <i>value</i>	Memory control logic not operating properly.	Installed memory module faulty or improperly seated.
Memory allocation error	The software in use conflicts with the operating system, an application program, or a utility	Faulty application program

Table 3-2. System Error Messages (Continued)

Message	Definition	Probable Causes
Memory data line failure at <i>address</i> , read <i>value</i> expecting <i>value</i>	Memory not operating properly.	Installed memory module faulty or improperly seated.
Memory double word logic failure at <i>address</i> , read <i>value</i> expecting <i>value</i>		
Memory odd/even logic failure at <i>address</i> , read <i>value</i> expecting <i>value</i>		
Memory write/read failure at <i>address</i> , read <i>value</i> expecting <i>value</i>		
No boot device available	Computer not recognizing diskette drive or hard-disk drive from which it is trying to boot.	No boot device available.
No boot sector on hard-disk drive	No boot sector on hard-disk drive.	Operating system boot files missing or corrupted.
No timer tick interrupt	Timer on system board malfunctioning.	System board faulty.
Non-system disk or disk error	Unable to boot from hard-disk drive or diskette drive.	No operating system files on hard-disk drive or diskette.
Not a boot diskette		
Optional ROM bad checksum	ROM in external device failed.	Optional ROM in external device faulty.
Sector not found	MS-DOS [®] unable to locate a sector on diskette or hard-disk drive.	Bad sector or corrupted FAT on diskette or hard-disk drive.

Table 3-2. System Error Messages (Continued)

Message	Definition	Probable Causes
Seek error	MS-DOS unable to find specific track on diskette or hard-disk drive.	Defective diskette or hard-disk drive.
Shutdown failure	Microprocessor unable to reset.	System board faulty.
Time-of-day clock lost power	System clock stopped.	Reserve battery lost its charge.
Time-of-day clock stopped		
Time-of-day not set—please run the System Setup program.	Time or date stored in RTC does not match system clock.	Reserve battery lost its charge. System board faulty.
Timer chip counter 2 failed	Timer circuit on system board malfunctioning.	System board faulty.
Unexpected interrupt in protected mode	Keyboard/mouse controller malfunctioning, or memory module(s) not responding.	One or more memory module(s) faulty or improperly seated.
Warning! Battery is critically low.	Main battery has lost its charge.	Main battery needs recharging.

Running the Dell Diagnostics

The diagnostics contains tests that aid in troubleshooting the computer. If needed, see Chapter 4, “Running the Dell Diagnostics,” in the *Reference and Troubleshooting Guide*. The diagnostics diskette contains the following test groups:

- RAM — Tests the main memory
- System Set — Tests the system board’s primary functions
- Video — Tests the video subsystem
- Keyboard — Tests the keyboard subsystem
- Mouse — Tests the mouse/trackball subsystem
- Diskette Drives — Tests the diskette drive subsystem
- Hard-Disk Drives (Non-SCSI) — Tests the IDE hard-disk drive subsystem
- IDE CD-ROM Drives — Tests the CD-ROM drive subsystem

- Serial Ports — Tests the serial communication port
- Parallel Ports — Tests the parallel communication port
- SCSI Devices — Tests the SCSI controller in the Advanced Port Replicator
- Network Interface — Tests the network controller in the Advanced Port Replicator
- Serial Infrared — Tests the IrDA communications port
- Audio — Tests the built-in sound subsystem

CAUTION: To prevent possible damage to the original diagnostics diskette, always use a backup copy of the diagnostics diskette when servicing a user's system. If the user has not already made a backup copy of the diagnostics diskette, do so before you run the diagnostics.

To start the diagnostics, turn off the computer, insert a diagnostics diskette into the diskette drive, and then turn on the computer.

Starting the diagnostics causes the Dell logo screen to appear, followed by a message indicating that the diagnostics is loading. Before the diagnostics loads, a program tests the portion of main memory (RAM) required for loading the diagnostics. If a main memory error is detected, a message appears on the screen telling you which memory address failed.

If no errors are found in main memory, the diagnostics loads and the Diagnostics Menu appears. This menu lets you choose the following options or exit to the MS-DOS prompt:

- **RUN QUICK TESTS** — Runs selected tests from all test groups to quickly locate the failure or to indicate where further testing may be needed to isolate a failure
- **RUN ALL TESTS** — Runs all tests for a thorough test of the computer
- **RUN SPECIFIC TESTS** — Tests a particular area or subsystem

Chapter 4

Removing and Replacing Parts

This chapter provides instructions for removing and replacing field-replaceable components, assemblies, and subassemblies. For removal and replacement procedures for factory-replaceable parts, see Appendix A, “Factory Repair Parts.”

Unless otherwise noted, each procedure in this chapter assumes the following:

- The computer and any attached peripherals are turned off, and the peripherals are disconnected from the I/O panel on the back of the computer.
- A part can be replaced by performing the removal procedure in reverse order.

When the display assembly is open nearly 180 degrees, use a book or something similar to support the display assembly. The angle of the display assembly with respect to the bottom case should never be allowed to exceed 180 degrees. Also, when performing the procedures in this chapter, the locations or directions relative to the computer are as shown in Figure 4-1 unless otherwise specified.

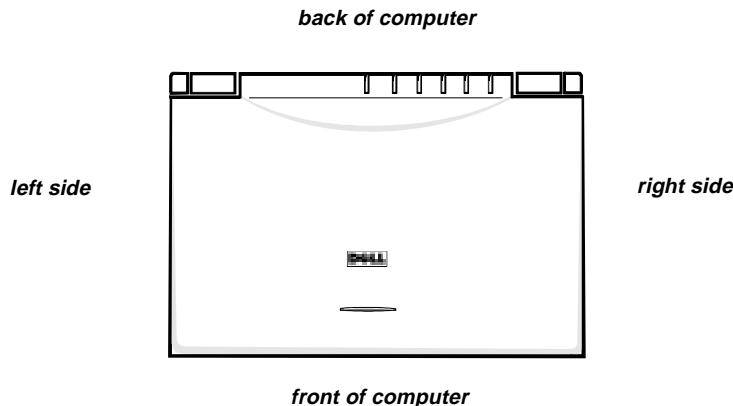


Figure 4-1. Computer Orientation

Recommended Tools

Most of the procedures in this guide require the use of one or more of the following tools:

- Small flat-blade screwdriver
- Jeweler's screwdriver set
- Number 1 magnetized Phillips-head screwdriver
- Number 2 magnetized Phillips-head screwdriver
- Chip-removal tool
- Wrist grounding strap
- Small plastic scribe
- Nut drivers

Precautionary Measures

WARNING: FOR YOUR PERSONAL SAFETY AND PROTECTION OF THE EQUIPMENT, PERFORM THE FOLLOWING STEPS IN THE SEQUENCE LISTED.

Before you start to work on the computer, perform the following steps:

- 1. Turn off the computer and any attached peripherals.**

NOTE: Make sure the computer is turned off and not in suspend-to-disk mode. See "Controlling Computer Power" in Chapter 1.

- 2. Disconnect the computer and any attached peripherals from AC power sources to reduce the potential for personal injury or shock. Also disconnect any telephone or telecommunications lines from the computer.**
- 3. Remove the main battery assembly from the battery compartment.**

Slide the battery compartment door downward until it stops (about 3/16 of an inch). Slide the main battery assembly out.

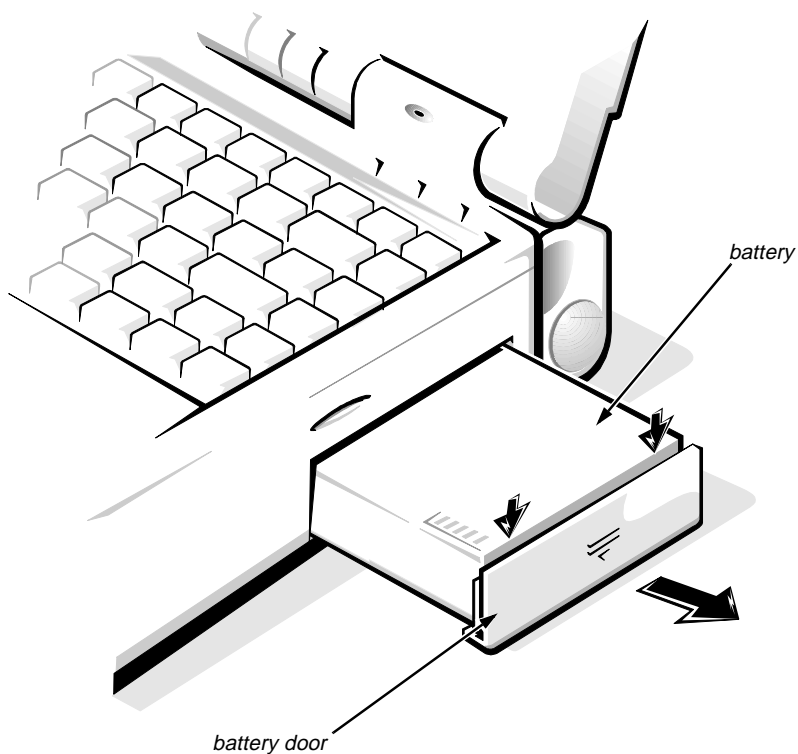


Figure 4-2. Main Battery Assembly Removal

Part or Assembly Name	Order Name
Main battery assembly	CUS,BTRY,SAR,36WHR,LXP

- To avoid possible damage to the computer from ESD, ground yourself by attaching a wrist grounding strap to yourself and an unpainted metal surface on the I/O panel.**

If a wrist grounding strap is not available, you can discharge static electricity from your body by periodically touching the unpainted metal surface of the I/O panel.

Screw Identification and Tightening

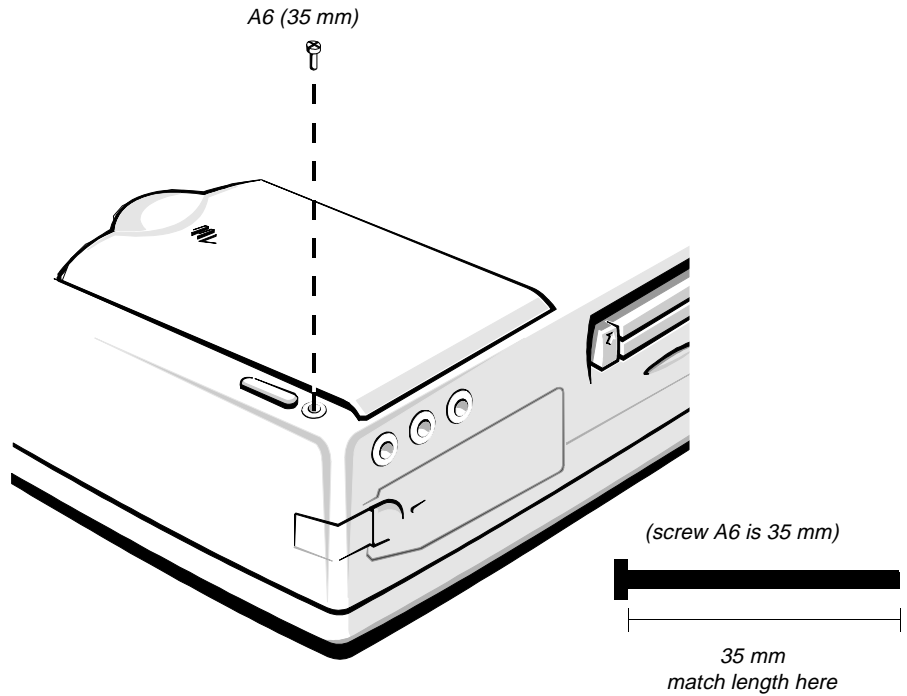


Figure 4-3. Screw Identification

CAUTION: It is essential that the correct length screw be used when reinstalling a screw. Otherwise, hardware damage could result. Make sure that the screw is properly aligned with its corresponding hole, and avoid overtightening.

The removal procedure illustrations provide the correct screw length in parentheses next to the screw's label. Also, a graphic for that length screw is included in the illustration. Match the actual screw to the graphic in the illustration to check for correct length.

ZIF Connectors

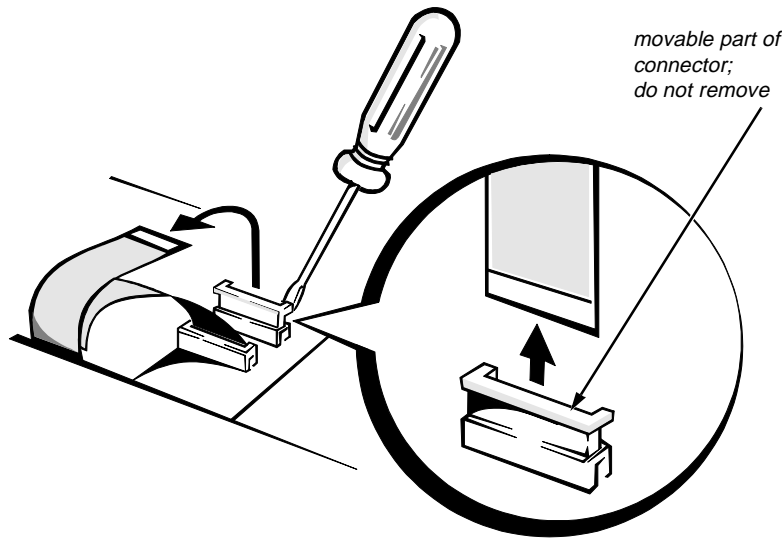


Figure 4-4. Disconnecting an Interface Cable

Some of the computer's interface connectors are zero insertion force (ZIF) connectors. These connectors are not removable, but they must be released to disconnect a cable from them.

CAUTION: The ZIF connectors are fragile. To avoid damage, do not apply too much pressure to the movable part of the connector.

To disconnect an interface cable from a ZIF connector, follow these steps:

1. **Insert a small flat-blade screwdriver or a chip-removal tool under the movable part of the connector.**

If a small flat-blade screwdriver is unavailable, use a chip-removal tool to carefully pry up on first one end of the movable part of the connector and then the other end.

2. **Pull gently upward on the movable part of the connector until it releases the interface cable.**
3. **Grasp the interface cable and pull it out of the connector.**

To reconnect an interface cable to a ZIF connector, follow these steps:

1. **Use a flat-blade screwdriver or chip-removal tool to open the movable part of the ZIF connector.**
2. **Orient the end of the interface cable with the ZIF connector, and insert the end of the cable into the connector.**
3. **While holding the cable in place, close the ZIF connector.**

To ensure a firm connection, make sure the ZIF connector is completely closed.

Field-Replaceable Parts and Assemblies

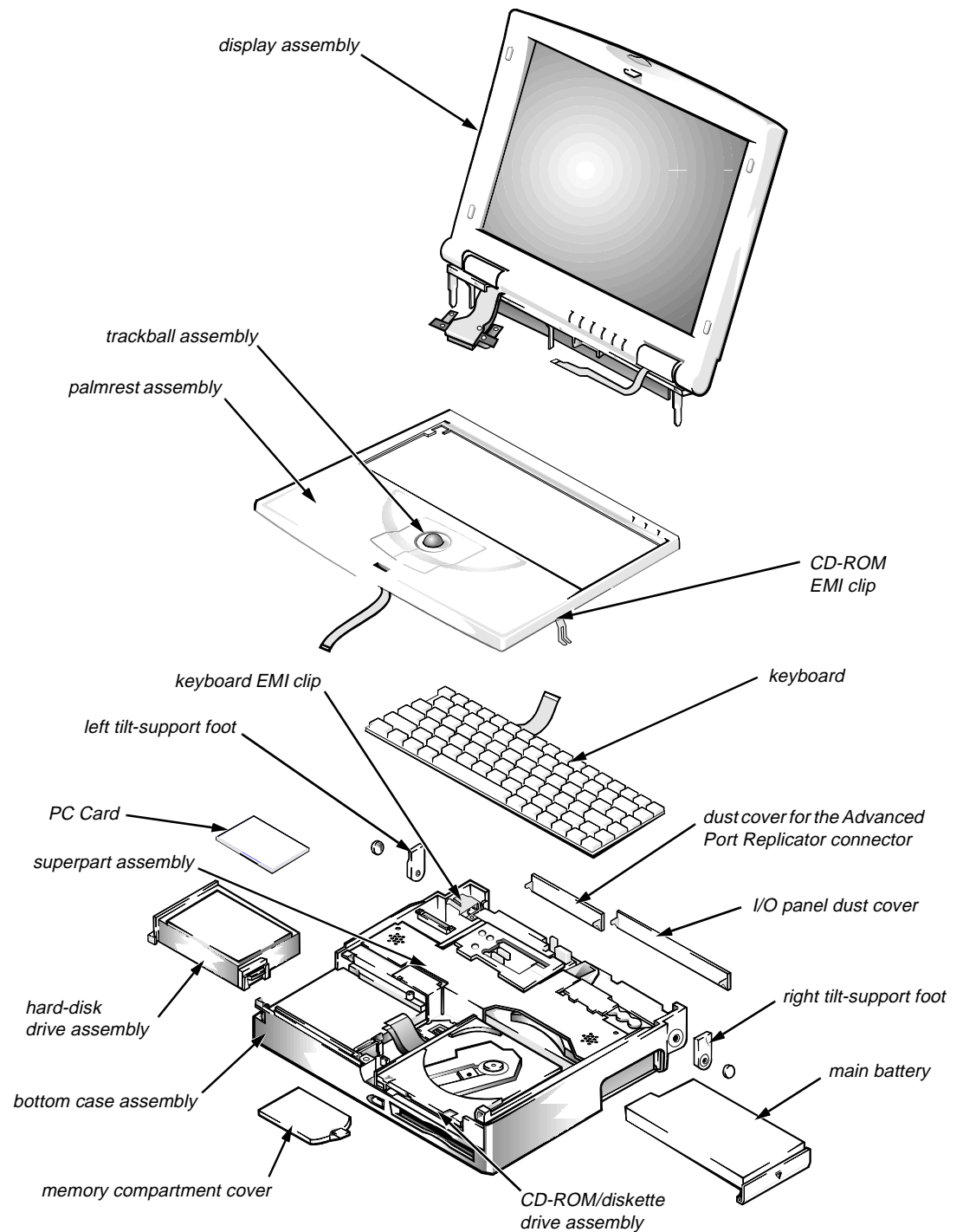


Figure 4-5. Exploded View—Computer

The computer is divided into three major assemblies: the palmrest assembly (which contains the keyboard and the trackball), the display assembly (which contains the LCD), and the bottom case assembly (which contains many of the removable parts).

The following subsections provide instructions for removing and replacing these parts and assemblies. Some of the instructions are preceded by a table listing the Dell order name for the part or assembly being replaced. A more detailed breakdown of parts and assemblies can be found in Appendix A, “Factory Repair Parts.”

Hard-Disk Drive Assembly

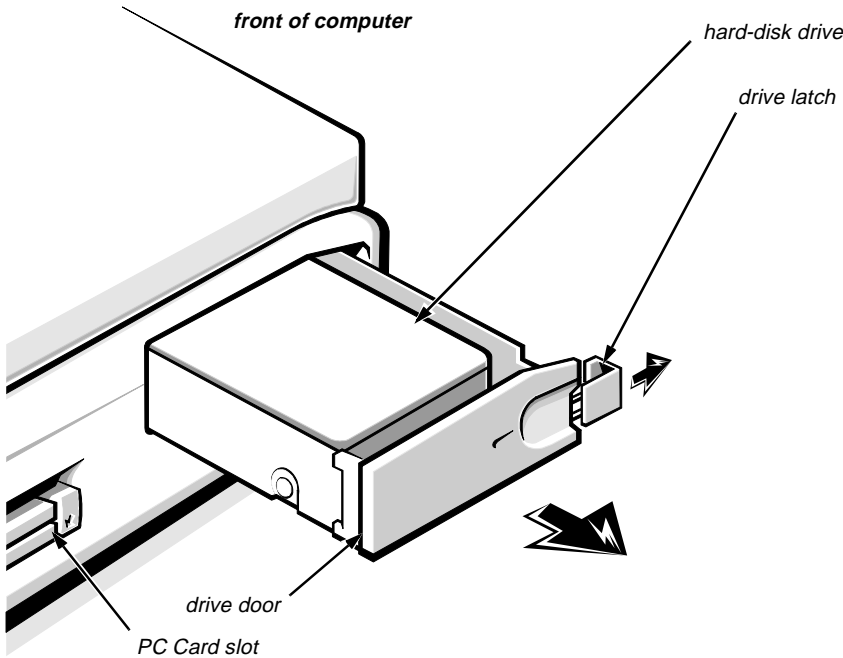


Figure 4-6. Hard-Disk Drive Assembly Removal

Part or Assembly Name	Order Name
Hard-disk drive assembly	CUS,HD,xxxxx,yyMM,zzz,LXP*

* Substitute the drive capacity for xxxxx, the drive height for yy, and the manufacturer for zzz.

To remove the hard-disk drive assembly, follow these steps:

1. **Slide the drive latch toward the front of the computer to release the hard-disk drive assembly from the hard-disk drive bay.**

The latch is on the left-front corner of the computer.

2. **Grasp the drive door and pull the drive out of the computer.**

When reinserting the drive into the drive bay, ensure that the drive latch is open. Then slide the drive completely into the hard-disk drive bay.

CAUTION: The hard-disk drive is very sensitive to shock. Handle the assembly with care and avoid dropping it even from a height of 1 inch.

Memory Compartment Cover

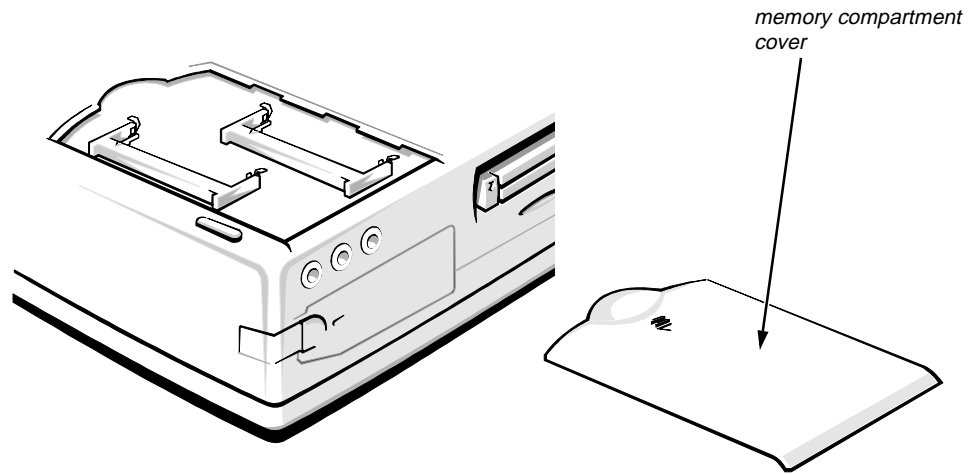


Figure 4-7. Memory Compartment Cover Removal

Part or Assembly Name	Order Name
Memory compartment cover	CVR, MEM, LXPiCD

To remove the memory compartment cover, follow these steps:

CAUTION: Make sure the work surface is clean to prevent scratching the computer cover.

1. Turn the computer upside down on the work surface.
2. To release the memory compartment cover, press down on the indentation in the edge of the cover, and then slide the cover towards the edge of the computer.

Memory Modules

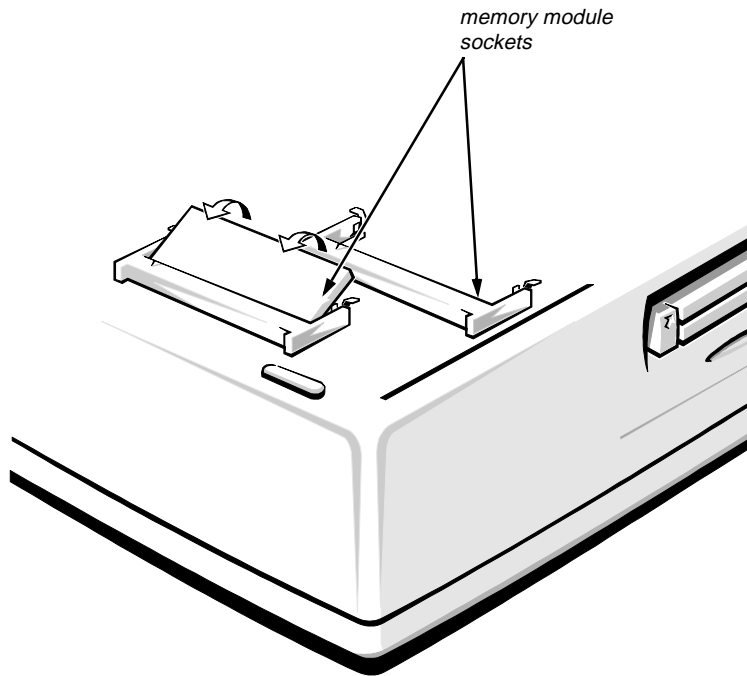


Figure 4-8. Memory Module Removal

Part or Assembly Name	Order Name
Memory module, 4-MB	CUS, MEM, 4M, LXP4D/T, LXPI
Memory module, 8-MB	CUS, MEM, 8M, LXP4D/T, LXPI
Memory module, 16-MB	CUS, MEM, 16M, LXP4D/T, LXPI

To remove a memory module, follow these steps:

- 1. Remove the memory compartment cover.**
- 2. To release a memory module from its socket, gently push outward on each of the memory module's two metal retaining clips.**

The memory module should rotate upward out of its retaining clips.

- 3. Lift the memory module out of its socket.**

Memory modules can be installed only one way. Do not attempt to force the memory module into the socket. Align the notch in one corner of the memory module with the corresponding indent in the memory module socket.

Palmrest Assembly

The palmrest assembly consists of the trackball and the keyboard.

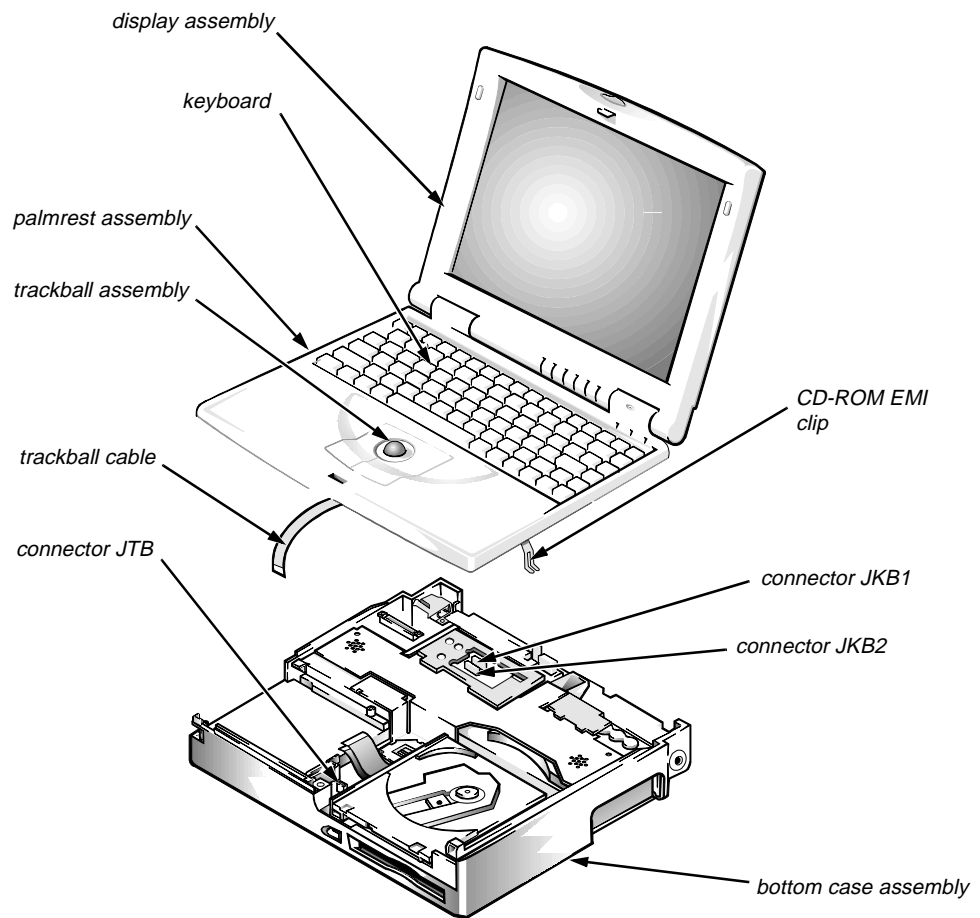


Figure 4-9. Palmrest Assembly Removal

Part or Assembly Name	Order Name
Palmrest assembly with sound	SVC,ASSY,PLMRST,LXPiCD

To remove the palmrest assembly, follow these steps:

1. Remove any installed PC Card(s).
2. Disconnect any cables attached to the audio ports.
3. Remove the hard-disk drive assembly.

CAUTION: Make sure the work surface is clean to prevent scratching the computer cover.

4. Close the display assembly, and turn the computer upside down on a flat work surface.
5. Remove the three palmrest-assembly retaining screws A1, A2, and A3 (see Figure 4-10).

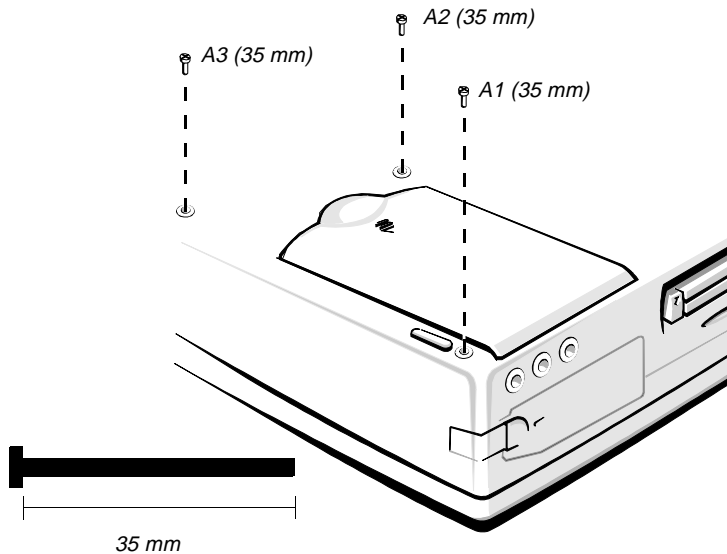


Figure 4-10. Palmrest-Assembly Retaining Screws

6. Turn the computer right-side up on the work surface, and open the display assembly.

NOTE: Remember to support the display assembly with a book or similar object so that the display assembly does not open beyond 180 degrees.

7. Release the palmrest assembly from the bottom case assembly (see Figure 4-9).

To release the palmrest assembly, lift the front of the assembly upward with one hand approximately 1 inch. Then, with the fingers of the other hand, disconnect the trackball cable from LIF connector JTB.

8. Rotate the front of the palmrest assembly towards the display assembly.
9. Disconnect the two keyboard cables from ZIF connectors JKB1 and JKB2.
10. Carefully lift the palmrest assembly from the bottom case assembly.

The keyboard is captured in the palmrest by snaps and tabs.

To reseal the palmrest assembly on the bottom case assembly, set the palmrest assembly down, slightly forward of its original position, on top of the bottom case assembly. Then push down on all sides of the palmrest assembly while sliding the assembly toward the back of the computer.

Ensure that the palmrest assembly is properly aligned and fully seated on the bottom case assembly and that all of the mounting tabs are fully engaged. Then close the display assembly, turn the computer upside down on the work surface, and reinstall retaining screws A1, A2, and A3 (see Figure 4-10).

CAUTION: Be careful not to bend the CD-ROM EMI clip. Set the palmrest assembly top side down, when the palmrest assembly is free from the bottom case assembly.

Trackball Assembly

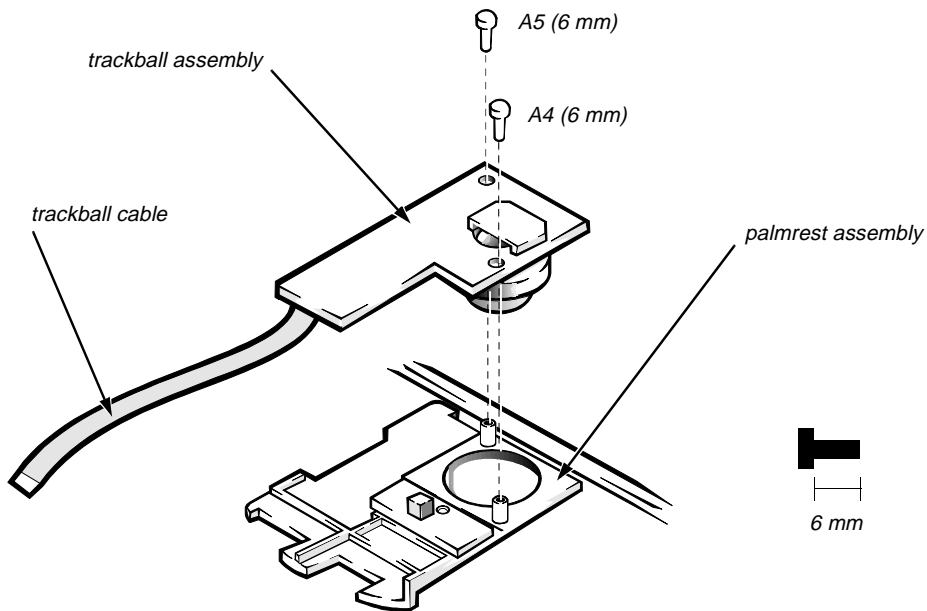


Figure 4-11. Trackball Assembly Removal

Part or Assembly Name	Order Name
Optical trackball assembly	SVC,ASSY,TBALL/SWT,LXPi+

To remove the trackball assembly, follow these steps:

- 1. Remove the palmrest assembly.**
- 2. Turn the palmrest assembly upside down on a flat work surface.**
- 3. Remove screws A4 and A5.**
- 4. Lift the trackball assembly out of the palmrest assembly.**

NOTE: It is not necessary to remove the trackball button board when removing the trackball assembly.

Keyboard Assembly

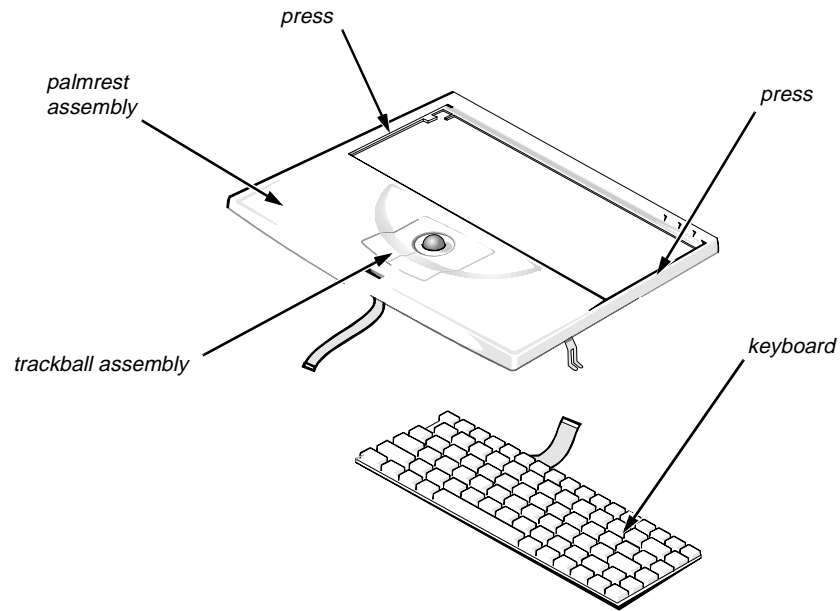


Figure 4-12. Keyboard Assembly Removal

Part or Assembly Name	Order Name
Keyboard assembly, Belgium	KYBD,86,BEL,ALPS,LXPi+
Keyboard assembly, China	KYBD,85,CHI,ALPS,LXPi+
Keyboard assembly, domestic	SVC,KYBD,85,DOM,LXPi+
Keyboard assembly, Danish	KYBD,86,DEN,ALPS,LXPi+
Keyboard assembly, French	KYBD,86,FR,ALPS,LXPi+
Keyboard assembly, French/ Canadian	KYBD,85,FR,CAN,ALPS,LXPi+
Keyboard assembly, German	KYBD,86,GER,ALPS,LXPi+
Keyboard assembly, Japan	KYBD,87,JPN,LXPi+
Keyboard assembly, Korean	KYBD,85,KOREA,ALPS,LXPi+
Keyboard assembly, Latin American	KYBD,86,LTN,ALPS,LXPi+
Keyboard assembly, Norwegian	KYBD,86,NOR,ALPS,LXPi+
Keyboard assembly, Russian	KYBD,86,RUS,ALPS,LXPi+
Keyboard assembly, Spanish	KYBD,86,SPN,ALPS,LXPi+
Keyboard assembly, Swedish	KYBD,86,SWE,ALPS,LXPi+

Part or Assembly Name	Order Name
Keyboard assembly, Swiss	KYBD,86,SWI,ALPS,LXPi+
Keyboard assembly, Thailand	KYBD,85,THAI,ALPS,LXPi+
Keyboard assembly, United Kingdom	KYBD,84,UK,LXPi+

To remove the keyboard assembly, follow these steps:

- 1. Remove the palmrest assembly.**
- 2. Press along the sides of the keyboard to release the keyboard from the palmrest assembly.**

Display Assembly

For removal procedures, the display assembly consists of the following:

- Tilt-support foot
- Display assembly bezel
- Display assembly latch and latch spring
- LCD panel
- LCD inverter board
- Hinge covers
- Display-assembly interface cable
- Microphone/switch assembly

Tilt-Support Foot

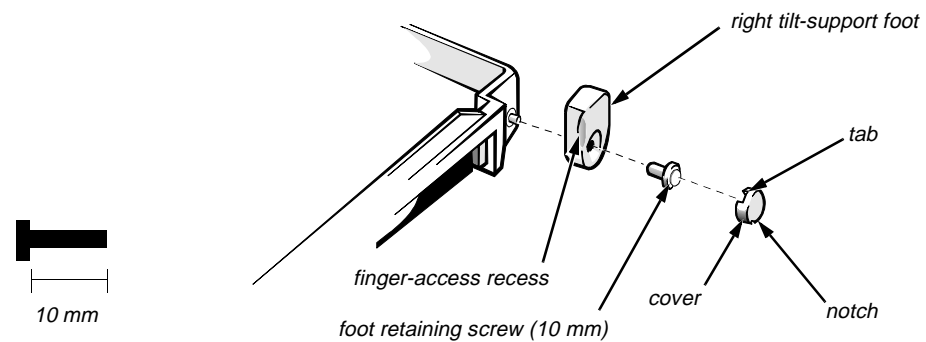


Figure 4-13. Tilt-Support Foot Removal

Part or Assembly Name	Order Name
Tilt-support foot, left	FOOT,PLSTC,REAR,LF,LXPiCD
Tilt-support foot, right	FOOT,PLSTC,REAR,RT,LXPiCD

To remove a tilt-support foot, follow these steps:

1. **Close the display assembly.**
2. **With the foot set to its fully retracted position, insert a small device (such as a scribe) into the bottom notch on the foot-retaining screw cover and gently lift out the cover partway. Lift on the sides of the cover, working around to the top, and then lift out the cover.**
3. **Remove the foot retaining screw.**

The foot retaining screw also functions as a mounting screw for one of the display assembly hinges, which has a threaded hole for the screw.

Therefore, the foot retaining screws cannot be reinstalled with the display assembly removed.

The foot-retaining screw cover can fit only one way in the foot. To reinstall the cover, make sure the tilt-support foot is in its fully retracted position.

Then orient the cover with the notch toward the bottom of the computer and its mounting tab toward the top of the computer. Press in on the cover until it snaps into place.

Display Assembly

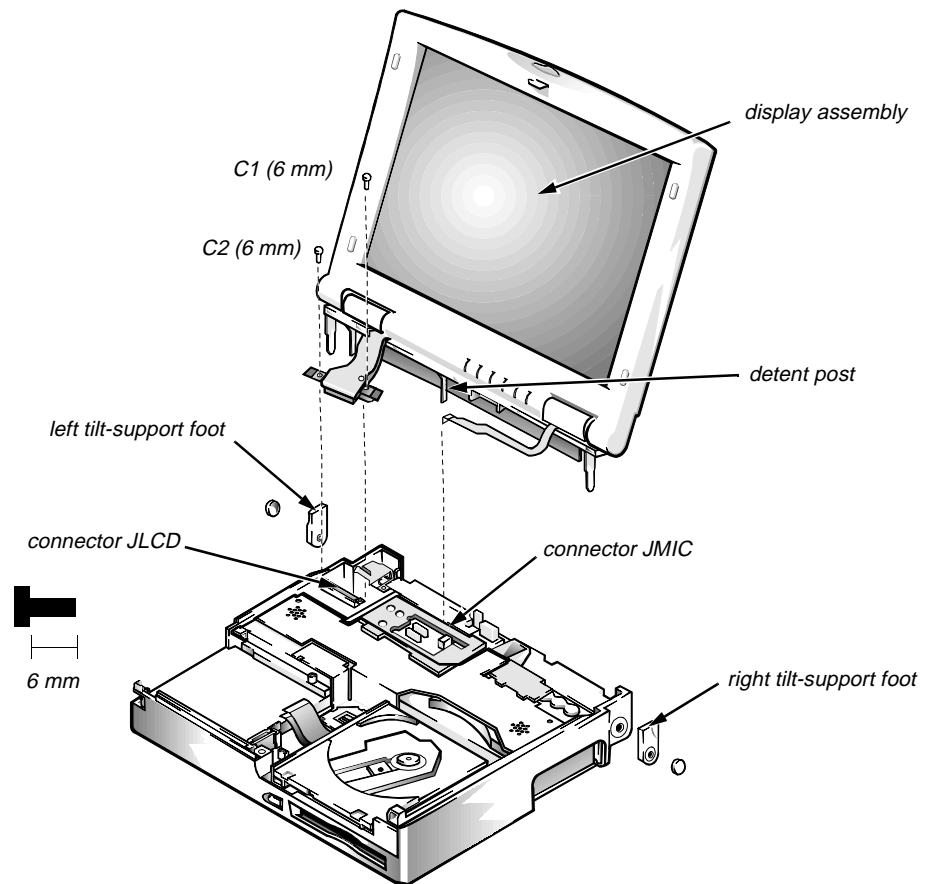


Figure 4-14. Display Assembly Removal

Part or Assembly Name	Order Name
Display assembly	ASSY,LCD,TFT,SVGA,12.1", LXPiCD

To remove the display assembly, follow these steps:

1. **Remove the palmrest assembly.**
2. **Remove the computer's tilt-support feet.**
3. **Remove interface-cable grounding screws C1 and C2 from the display assembly.**

4. Disconnect the display-assembly interface cable from connector JLCD on the system board.

To disconnect the cable, grasp the pull tab and pull it straight up from the system board.

5. Disconnect the microphone cable from ZIF connector JM1C.

6. Lift the display assembly from the bottom case assembly.

A plastic detent post located approximately at the center of the display assembly may hang on the bottom case assembly. If so, carefully push the center of the display assembly away from the bottom case assembly.

Display Assembly Bezel

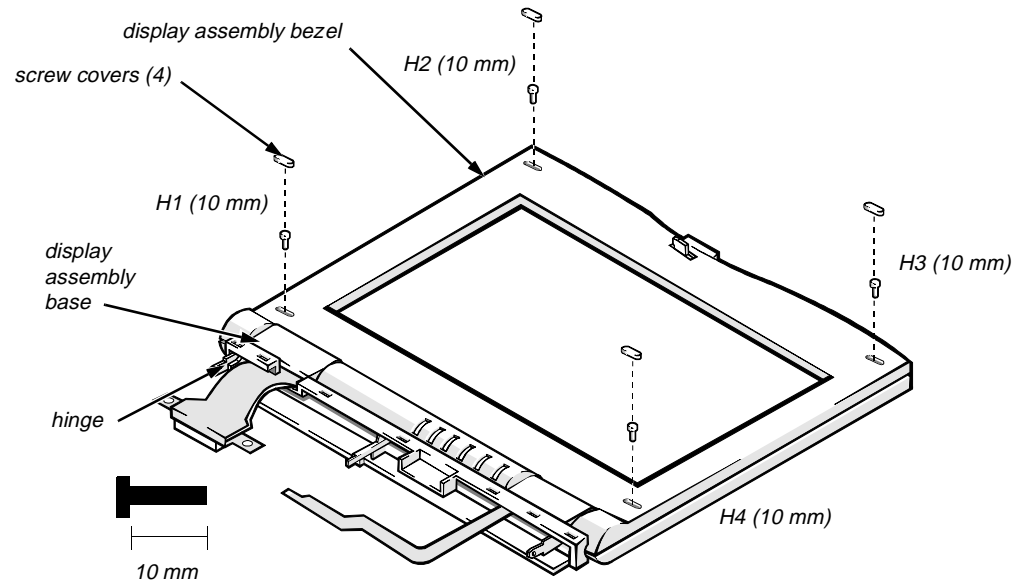


Figure 4-15. Display Assembly Bezel Removal

Part or Assembly Name	Order Name
Bezel service kit, 12.1-inch	SVC,BZL,LCD,TFT,LXPiCD
Display case service kit, 12.1-inch	SVC,CVR,BK,TFT,LXPi+

To remove the display assembly bezel, follow these steps:

1. Use a scribe to pry the retaining screw covers out of the screw holes in the bezel.
2. Remove retaining screws H1, H2, H3, and H4.
3. Separate the bezel from the display assembly.

Insert your fingertips between the bezel and the LCD, and lift upward on the bezel to release the hidden tabs just above the indicator panel, as well as the hidden tabs beneath each side of the bezel. Then slide the bezel toward the front of the computer, and lift it up and away from the display assembly.

When replacing the bezel, orient the bezel in its original position on the display assembly and press firmly near each tab until it snaps into position. Be careful to have the display latch and spring properly assembled.

Display Assembly Latch and Latch Spring

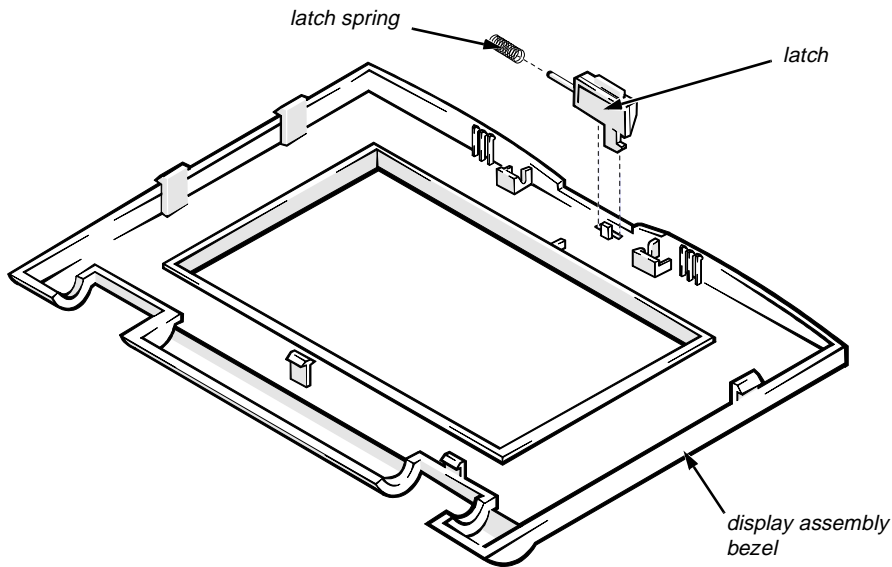


Figure 4-16. Display Assembly Latch and Latch Spring Removal

Part or Assembly Name	Order Name
Display assembly latch	LTCH,LXPiCD
Display assembly latch spring	SPR,LTCH,LXPiCD

To remove the display assembly latch and latch spring, follow these steps:

- 1. Remove the display assembly bezel.**
- 2. Turn the display assembly bezel upside down on the work surface.**
- 3. While holding down the display-assembly latch spring, slide the latch against the spring, rotate the latch upward, and lift the latch and spring out of the bezel.**

LCD Panel

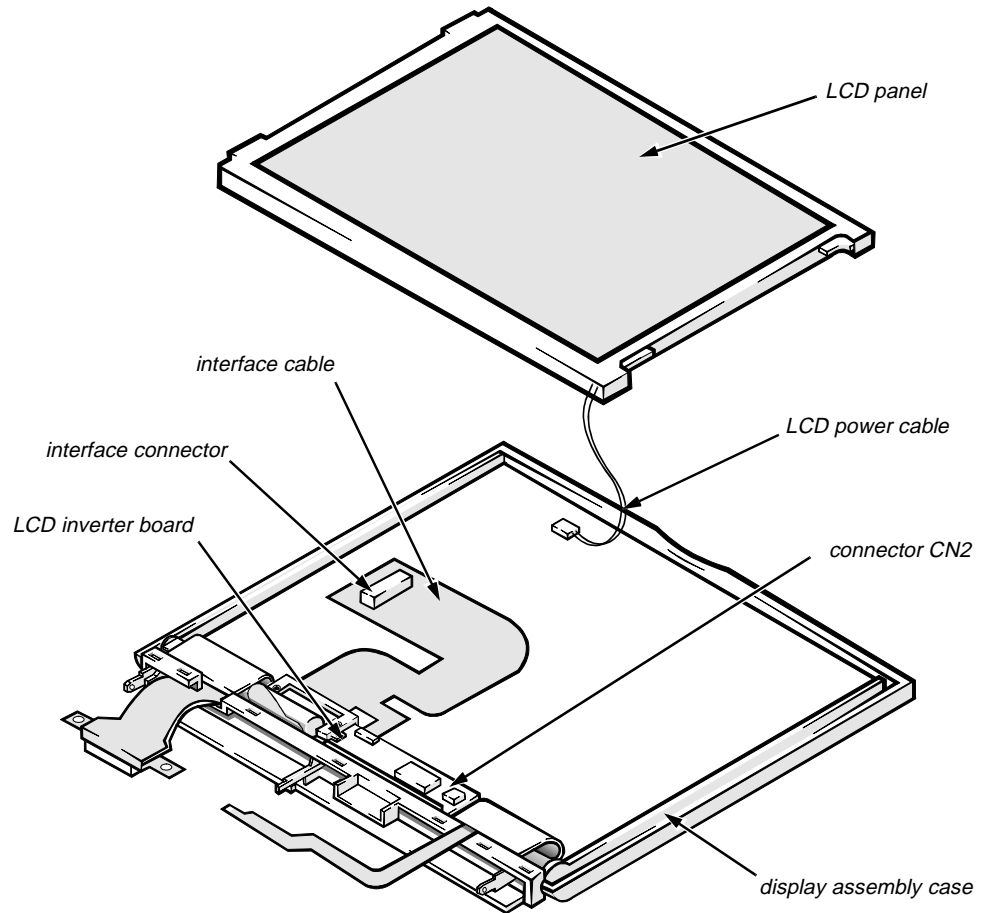


Figure 4-17. LCD Panel Removal

Part or Assembly Name	Order Name
LCD panel	LCD,TFT,SVGA,12.1",SAMSUNG
LCD assembly, LCD inverter board, active-matrix color, TFT SVGA display	SVC,LCD/INVTR,TFT,LXPiCD

To remove the LCD panel, follow these steps:

- 1. Remove the display assembly bezel.**
- 2. Lift the lower edge of the LCD panel about 1 inch.**
- 3. Disconnect the LCD-assembly power cable from connector CN2 on the LCD inverter board.**
- 4. Lift the lower edge of the LCD panel approximately 3 inches.**
- 5. Disconnect the display-assembly interface cable from the LCD interface connector on the underside of the LCD panel.**
- 6. Lift the LCD panel out of the display assembly case.**

LCD Inverter Board

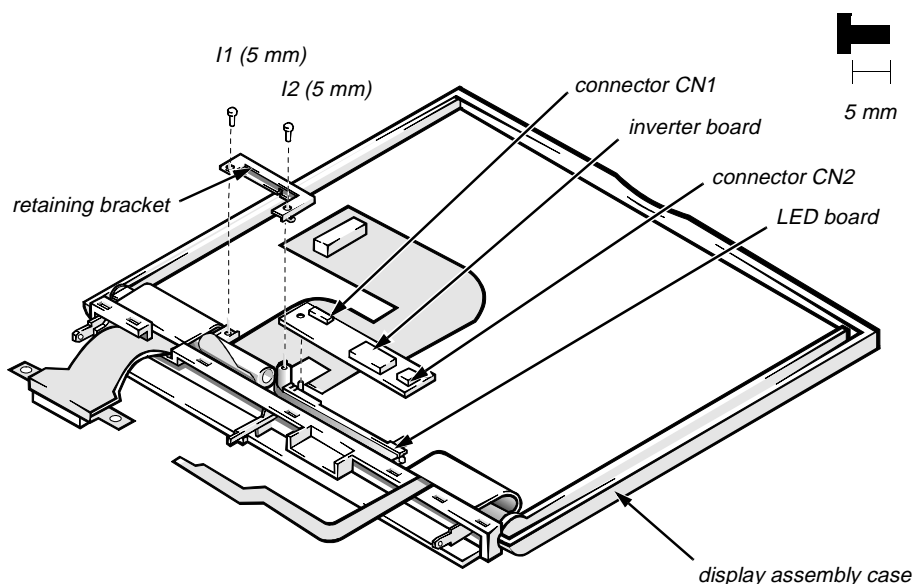


Figure 4-18. LCD Inverter Board Removal

Part or Assembly Name	Order Name
LCD inverter board	ASSY,BD,INVRTR,TFT,SVGA12.1"

To remove the LCD inverter board, follow these steps:

1. Remove the display assembly bezel.
2. Remove screws I1 and I2 securing the display-interface cable retaining bracket, and then remove the bracket.
3. Move the LED board out of the display assembly case far enough to gain access to the LCD inverter board.
4. Disconnect the LCD-inverter board interface cable from ZIF connector CN1 on the LCD inverter board.
5. Lift the LCD inverter board about 1/4 of an inch.
6. Disconnect the LCD power cable from connector CN2 on the LCD inverter board.
7. Lift the LCD inverter board out of the display assembly case.

Hinge Covers

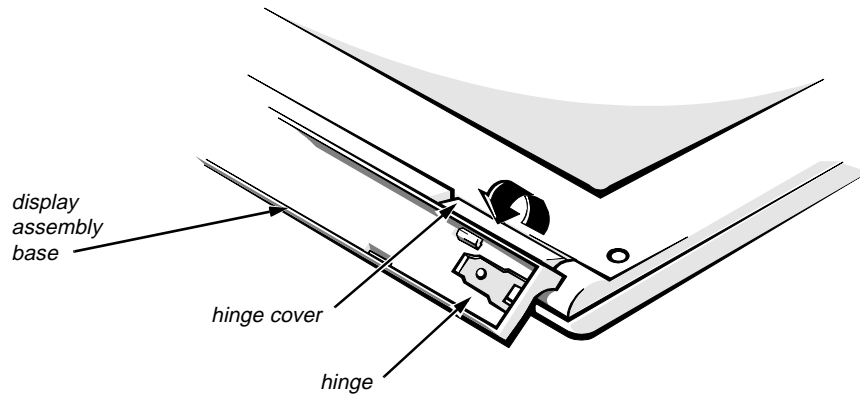


Figure 4-19. Hinge Covers Removal

Each of the hinge covers is held in place by three tabs that fit into slots on the display assembly base. The microphone is inside the right hinge cover. To remove the hinge covers, follow these steps:

- 1. Remove the display assembly from the computer.**
- 2. Place the display assembly faceup on the work surface.**
- 3. Rotate the display assembly base until the display assembly hinges are pointing upward at approximately a 45-degree angle.**
- 4. To remove a hinge cover, press in on the front of the cover to release the hinge cover's front tab. Then rotate the cover in the direction of the arrow, and lift the cover away from the display assembly base.**

To replace the hinge covers, set the display assembly base in the position shown, and reinsert the hinge cover into its original position, making sure that its two tab slots engage the tabs on the display assembly base. Then rotate the hinge cover opposite to the direction shown in Figure 4-18 until its front tab engages the tab slot in the display assembly base.

Display-Assembly Interface Cable

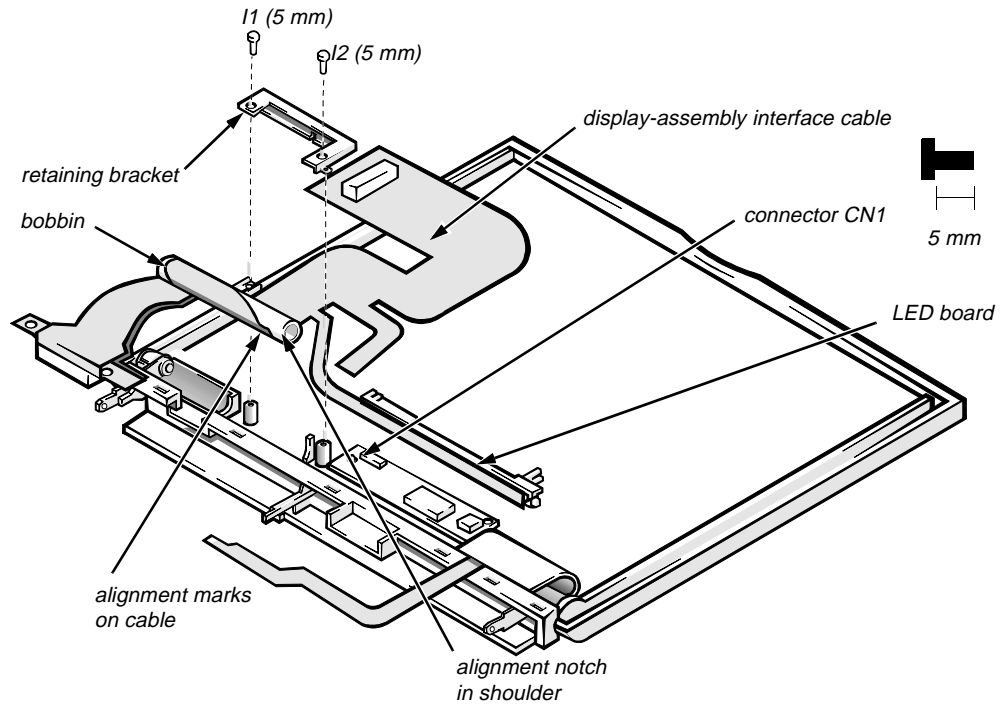


Figure 4-20. Display-Assembly Interface Cable Removal

Part or Assembly Name	Order Name
LCD cables, active-matrix, TFT SVGA display (includes display-assembly interface, LED board, and LCD-inverter-board interface cables)	SVC,CBL,LCD,TFT,SAMSUNG, LXPiCD

The display-assembly interface cable connects the system board, LCD panel, LCD inverter board, and LED board. The cable wraps around a bobbin. To remove the display-assembly interface cable, follow these steps:

1. Remove the display assembly.
2. Remove the display assembly bezel.
3. Remove the LCD panel.
4. Remove the left hinge cover.
5. Remove screws I1 and I2 securing the display-interface cable retaining bracket, then remove the bracket.
6. Disconnect the display-assembly interface cable from ZIF connector CN1 on the LCD inverter board.

- 7. Lift the display-assembly interface cable and bobbin out of the display assembly.**

NOTE: Some computers have a display-assembly interface cable that detaches from the bobbin. If you have a cable with a permanently attached bobbin, stop here; otherwise, proceed to Step 8.

- 8. Look at the alignment marks on the display-assembly interface cable, and note the alignment of the cable to the bobbin. Then carefully detach the cable from the bobbin.**

A double-sided adhesive strip attaches the cable to the bobbin (see Figure 4-20).

- 9. To reattach the display-assembly interface cable to the bobbin, align the marks on the cable with the notch in the shoulder of the bobbin, and then wrap the cable around the bobbin.**

If you are installing a new cable, remove the protective cover from the adhesive strip on the new cable. Align the alignment marks on the cable with the notch in the shoulder of the bobbin, and then wrap the cable around the bobbin, making sure it stays between the shoulders of the bobbin. Place the cable and bobbin into the display assembly before attaching the EMI shield.

Microphone/Switch Assembly

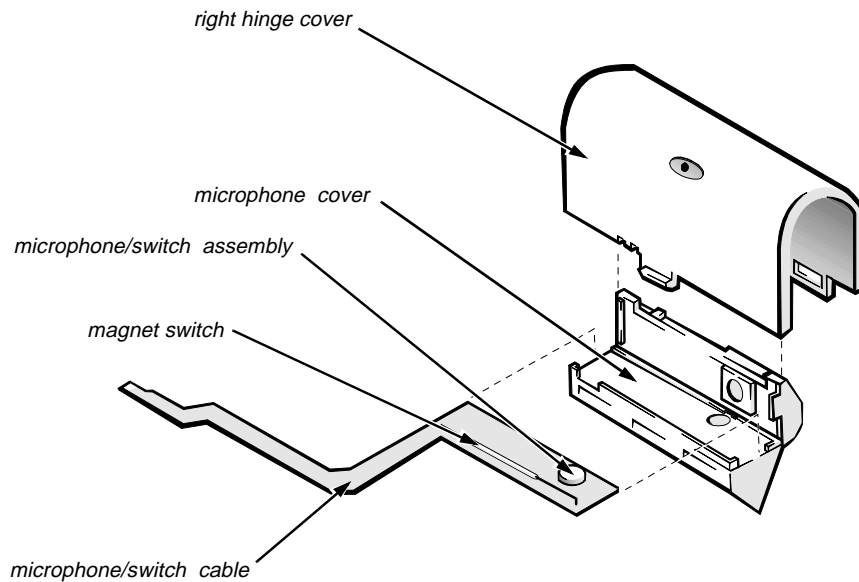


Figure 4-21. Microphone/Switch Assembly Removal

Part or Assembly Name	Order Name
Microphone service kit	SVC,MIPHN/SWT,LXPiCD

The microphone/switch assembly is inside the right hinge cover. There is a microphone and a magnetic reed switch on the microphone/switch assembly. To remove the microphone/switch assembly, follow these steps:

1. **Remove the display assembly.**
2. **Remove the right hinge cover. (Before doing so, note the correct routing of the microphone cable around the display assembly base.)**
3. **Remove the microphone cover from the right hinge cover.**
4. **Open the microphone cover, and remove the microphone/switch assembly.**

Bottom Case Assembly

The bottom case assembly consists of the following:

- Diskette/CD-ROM assembly
- Deck-buoy
- Superpart assembly
- System board
- 3.1-V power supply board
- I/O-panel dust cover
- Dust cover for the Advanced Port Replicator
- Audio board

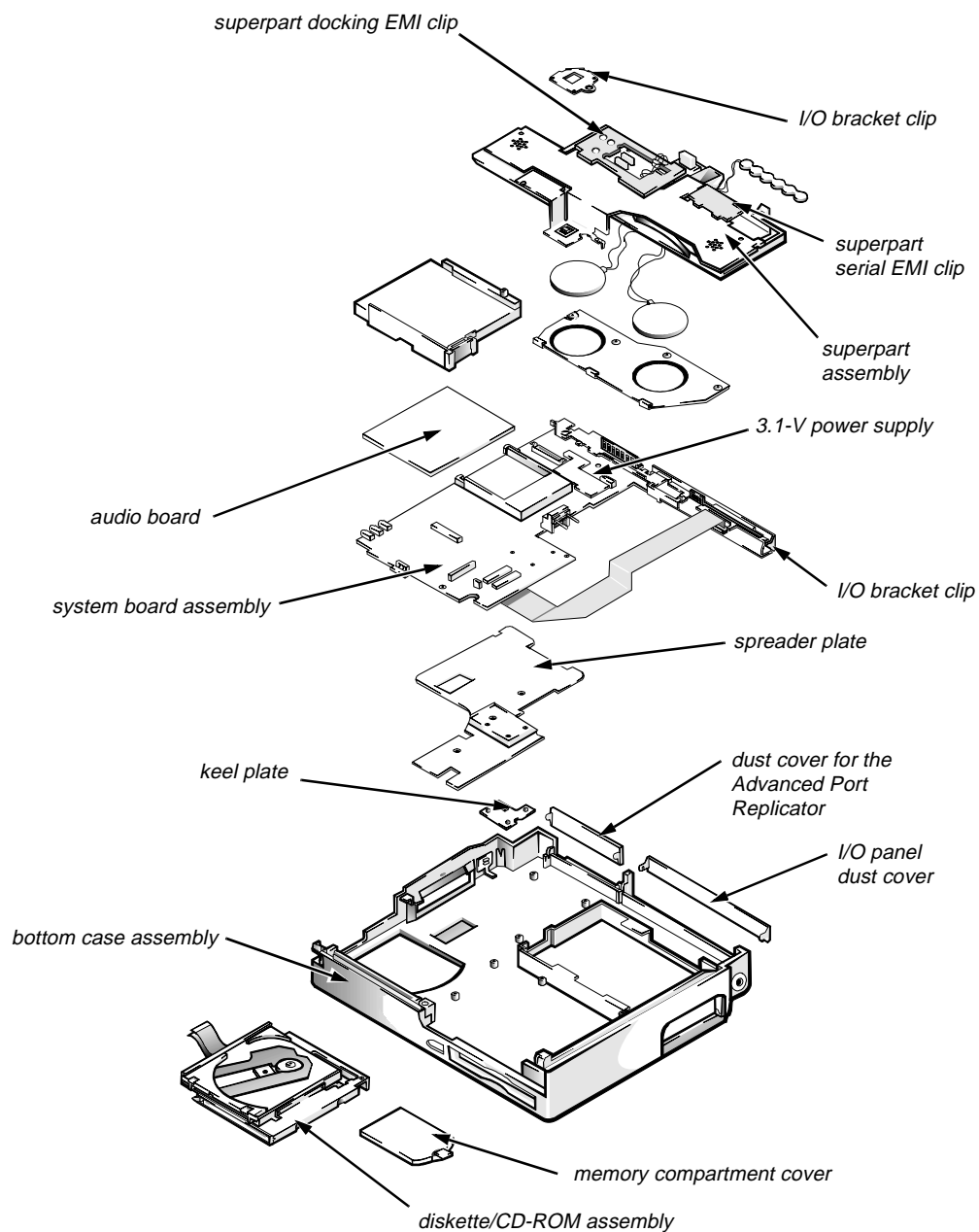


Figure 4-22. Bottom Case Assembly Removal

Part or Assembly Name	Order Name
Bottom case assembly	ASSY,CVR,BTM,LXPiCD

Diskette/CD-ROM Drive Assembly

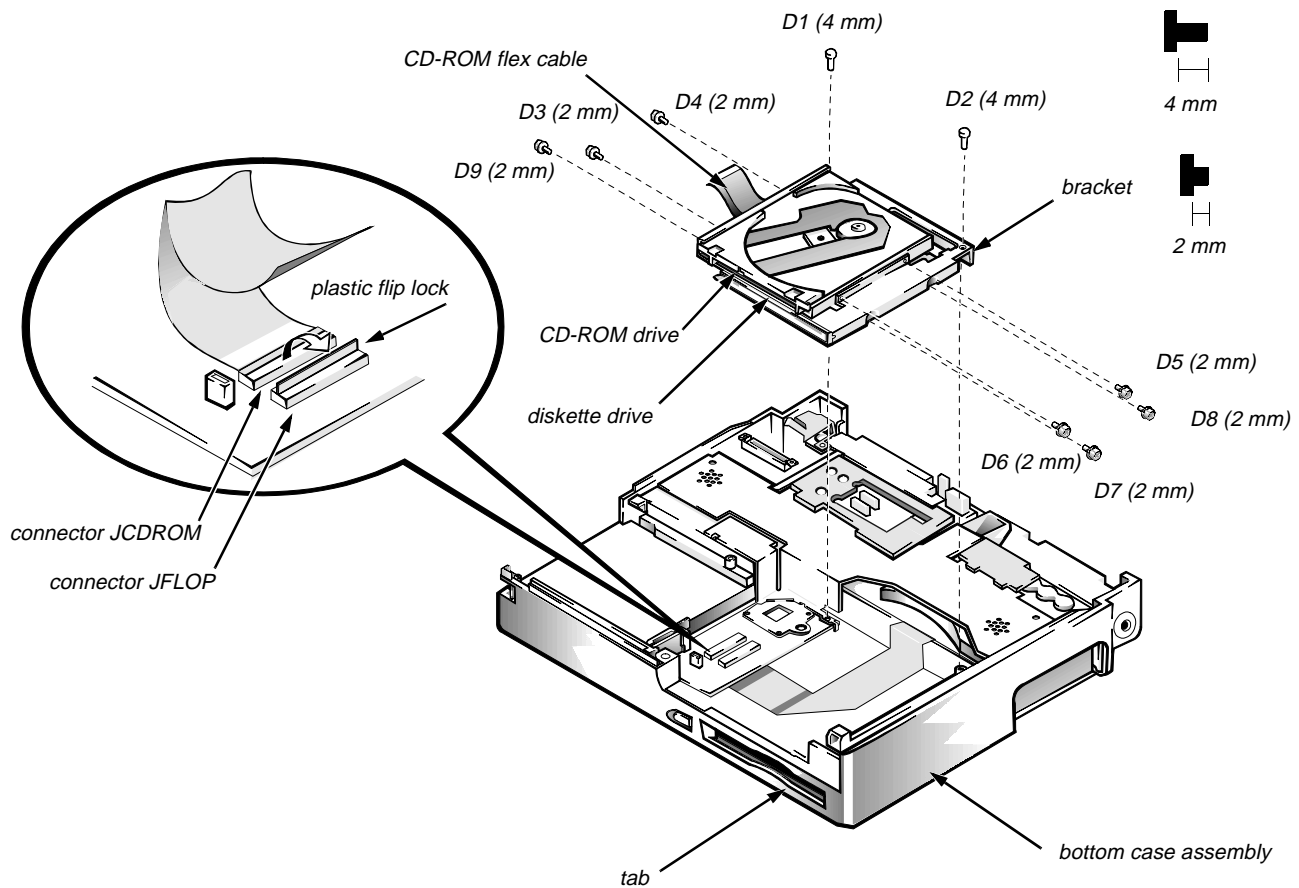


Figure 4-23. Diskette/CD-ROM Drive Assembly Removal

Part or Assembly Name	Order Name
Diskette drive assembly	SVC,ASSY,FD,LXPiCD
CD-ROM drive assembly	SVC,ASSY,CDROM,LXPiCD

To remove the diskette/CD-ROM drive assembly, follow these steps:

1. **Remove the palmrest assembly.**
2. **Remove screws D1 and D2 securing the diskette/CD-ROM drive assembly to the bottom case assembly.**
3. **Lift the back of the drive assembly slightly, and then slide the drive assembly toward the back of the computer about 1/4 of an inch**

4. Lift the drive assembly straight up about 1 inch.

The front edge of the drive assembly engages tabs on the bottom case assembly. Make sure the diskette drive assembly is clear of the tab before attempting to lift it out of the bottom case assembly.

CAUTION: Before removing the diskette drive and CD-ROM drive interface cables from connectors JFLOP and JCDROM, release each connector's plastic flip lock (see Figure 4-23). Do not pull the interface cable from the connector; doing so can ruin the cable's electrical conductivity.

5. Disconnect the diskette drive and CD-ROM drive interface cables from connectors JFLOP and JCDROM on the system board.

6. Lift the drive assembly out of the bottom case assembly.

When replacing the drive assembly, first connect the two drive interface cables to the system board. Then lower the drive assembly into the bottom case assembly, beginning with its forward edge, so that the diskette drive board fits between the tabs in the corner of the bottom case assembly.

CAUTION: Use care when handling the diskette/CD-ROM drive; it is fragile and will bend if handled improperly. Place the assembly on a flat work surface, and carefully remove the small 2-mm screws. Do not bend either the drives or the bracket. If bending occurs, the diskette or CD-ROM will not function correctly when inserted in the drive.

To separate the diskette/CD-ROM assembly into a diskette drive and a CD-ROM drive, remove screws D3 through D9. Lift up the CD-ROM, and remove it from the assembly. Slide the CD-ROM flex cable out of the slot in the bracket that holds the CD-ROM to the diskette drive.

Deck Buoy

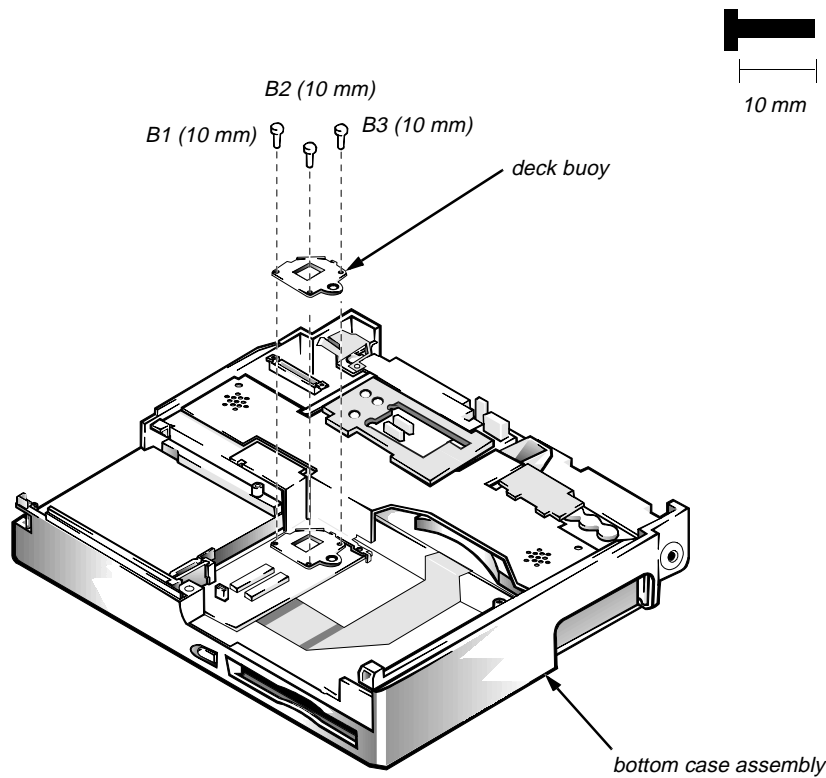


Figure 4-24. Deck Buoy Removal

Part or Assembly Name	Order Name
Deck buoy	ASSY,CLMP,THRM,LXPiCD

To remove the deck buoy, follow these steps:

1. **Remove the palmrest assembly.**
2. **Remove the display assembly.**
3. **Remove the diskette/CD-ROM assembly.**
4. **Remove screws B1, B2, and B3.**

Lift the deck buoy out of the bottom case assembly.

Superpart Assembly

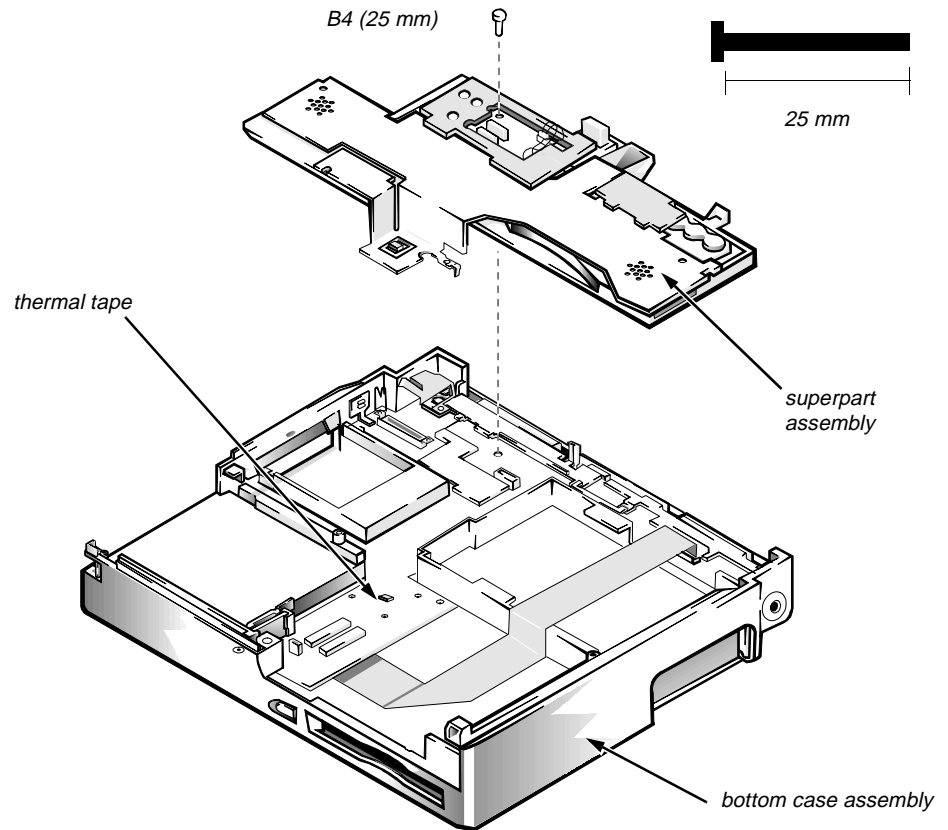


Figure 4-25. Superpart Assembly Removal

Part or Assembly Name	Order Name
Superpart assembly	SVC,ASSY,FAN/SPKR, BRKT,LXPiCD

The superpart assembly includes two speakers, two fans, the reserve battery, a printed circuit board for those parts, and an infrared printed circuit board. To remove the superpart assembly, follow these steps:

1. Remove the palmrest assembly.
2. Remove the display assembly.
3. Remove the diskette-drive/CD-ROM assembly.
4. Remove the deck-buoy.

5. Remove screw B4.

Lift the superpart assembly out of the bottom case assembly.

CAUTION: To prevent tearing the thermal tape, slowly pull the superpart assembly away from the system board.

Reserve Battery

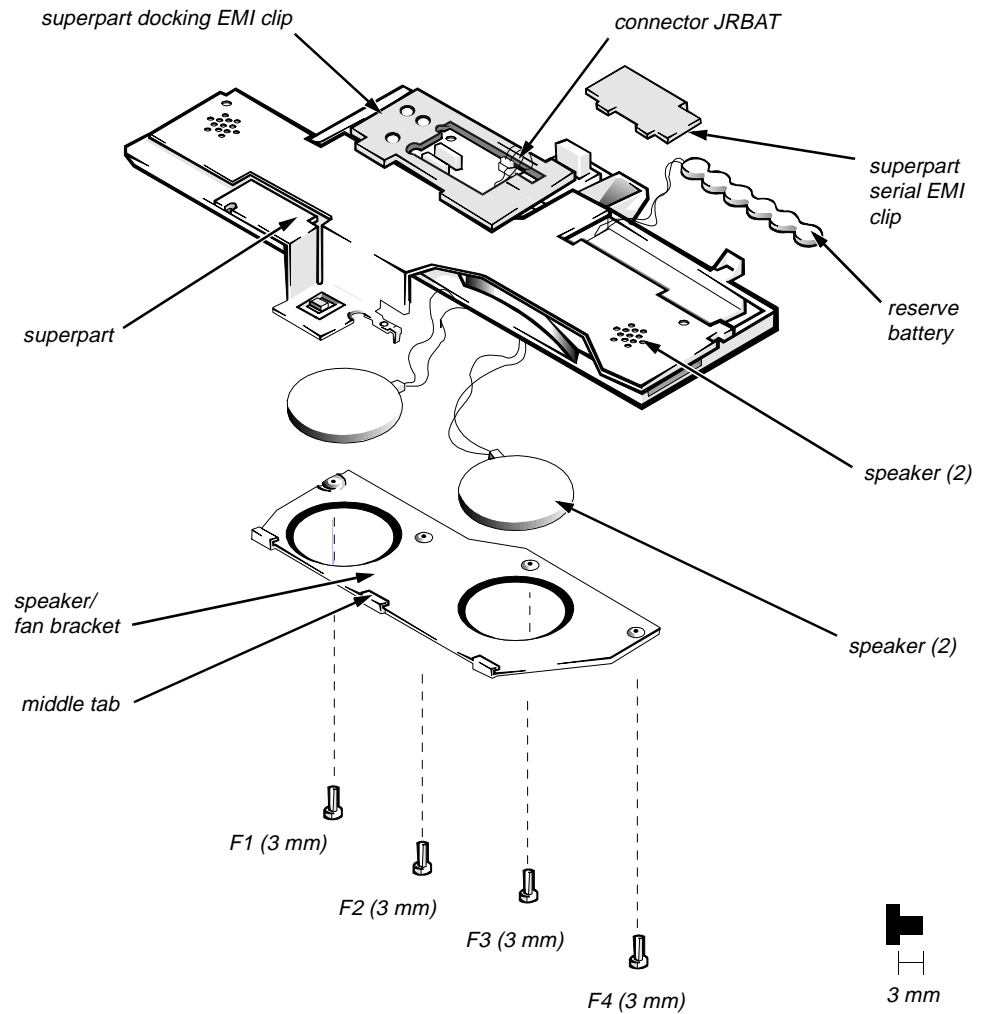


Figure 4-26. Reserve Battery Removal

Part or Assembly Name	Order Name
Reserve battery	SVC,BTRY,RSRV,LXP

CAUTION: The reserve battery provides power to the computer's RTC and NVRAM when the computer is turned off. Removing the battery causes the computer to lose its date and time information as well as user-settable parameters in the NVRAM. If possible, make a copy of this information before you remove the reserve battery.

To remove the reserve battery, follow these steps:

- 1. Remove the palmrest assembly.**
- 2. Remove the superpart assembly.**
- 3. Remove the superpart docking EMI clip and the superpart serial EMI clip.**
- 4. Unplug the battery from connector JRBAT.**
- 5. Place the superpart assembly upside down on a flat work surface.**
- 6. Remove screws F1 through F4.**

Remove the speaker/fan bracket protecting the speakers and fan.

CAUTION: When replacing the speaker/fan bracket, be sure to reinstall the middle tab correctly.

- 7. Lift the battery out of its recess in the superpart assembly.**

To free the reserve battery, thread the battery cable and connector through the opening in the plastic superpart assembly.

System Board Assembly

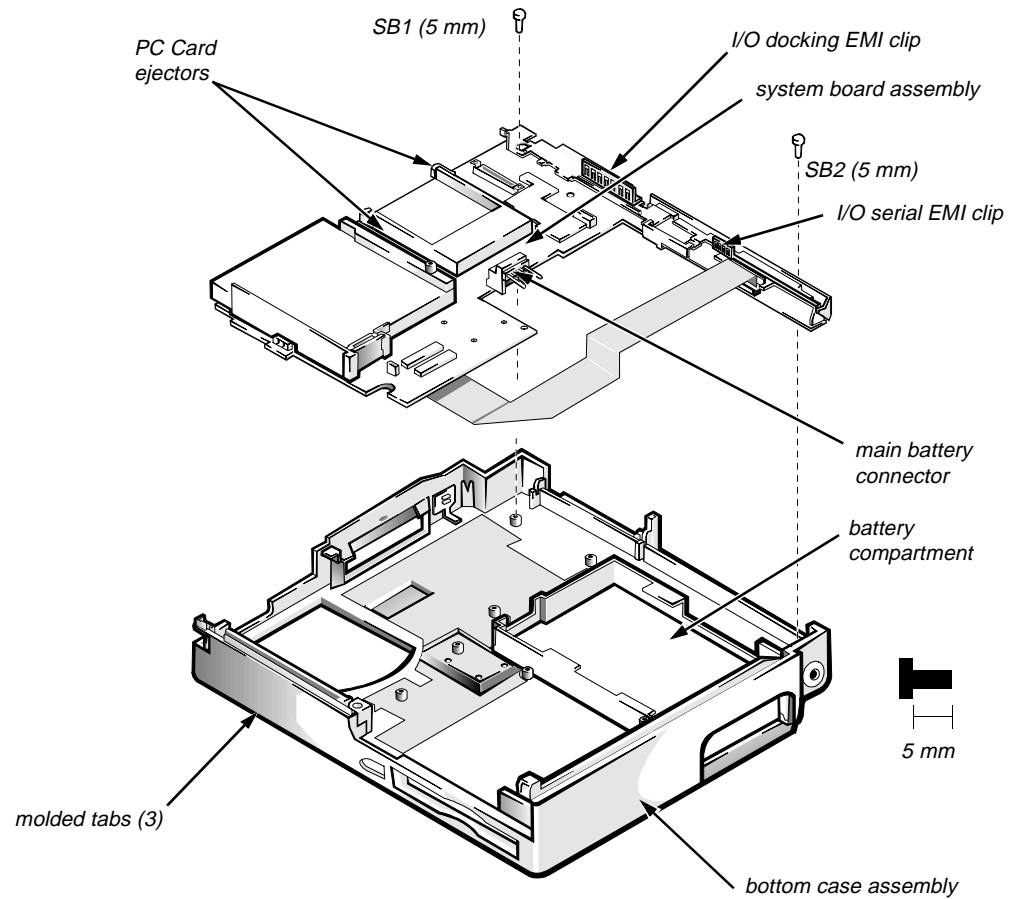


Figure 4-27. System Board Assembly Removal

Part or Assembly Name	Order Name
System board assembly	SVC,SYS,PLN,LXPiCD-150ST, WB,0M

CAUTION: Dell uses the system's service tag number to maintain a history of the computer and its maintenance services. Do not neglect to transfer the service tag number to the replacement system board assembly (see step 3 of "Replacing the System Board Assembly" found later in this section).

The system board's BIOS chip contains the system service tag number, which is also visible on a bar-code label on the bottom of the computer. The replacement kit for the system board assembly includes a diskette that provides a utility for transferring the service tag number to the replacement system board assembly.

Removing the System Board Assembly

To remove the system board assembly, follow these steps:

1. **Remove the palmrest assembly.**
2. **Remove the display assembly.**
3. **Remove the diskette/CD-ROM assembly.**
4. **Verify that the PC Card ejectors are fully depressed.**
5. **Remove the deck buoy plate. (Reinstall this part on the new system board.)**

CAUTION: To ensure maximum cooling for the microprocessor, do not touch the heat transfer area on the system board above the microprocessor or on the deck buoy plate. The oils in your skin reduce the heat transfer of the thermal pads.

6. **Remove the superpart assembly.**

Carefully disengage the superpart docking EMI and serial EMI clips from the I/O docking EMI and serial EMI clips.

7. **Remove screws SB1 and SB2, which retain the system board (see Figure 4-27).**
8. **Lift the system board approximately 2 inches from the back of the computer.**
9. **Disengage the front of the system board from the three molded tabs in the bottom case assembly.**

The tabs' approximate location is shown in Figure 4-27. The tabs are located alongside the hard-disk drive compartment, inside the bottom case assembly.

CAUTION: When removing the system board assembly, be careful not to damage the main battery connector and EMI shield on the bottom of the assembly.

10. **Lift the system board assembly out of the bottom case assembly.**

NOTE: If the main battery insulator comes out with the system board assembly, detach the insulator and set it aside.

Replacing the System Board Assembly

Observe the following precautions when you reinstall a system board:

1. **Before reinstalling the system board assembly, make sure the upper I/O bracket clip and the side I/O bracket clip are in place. If the side I/O bracket clip has been dislodged, reinstall it as shown in Figure 4-27.**

CAUTION: To avoid possible damage to the computer, make sure the system board assembly is inserted under the three molded tabs at the front of the bottom case assembly.

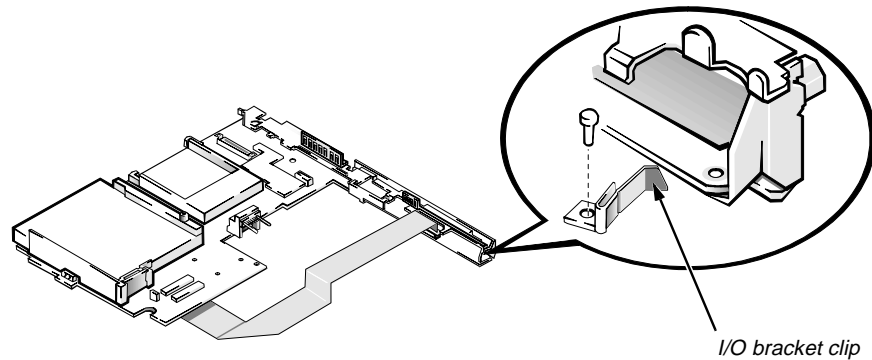


Figure 4-28. I/O Bracket Clips

2. **While reinstalling the system board assembly, make sure the power button is positioned as far as it will go toward the back of the computer.**

This will ensure that the power button engages the power switch properly.

3. **Enter the system's service tag number into the BIOS of the replacement system board assembly.**

Insert the diskette that accompanied the replacement system board assembly into the diskette drive, and turn on the computer. Follow the instructions on the display screen.

3.1-V Power Supply Board

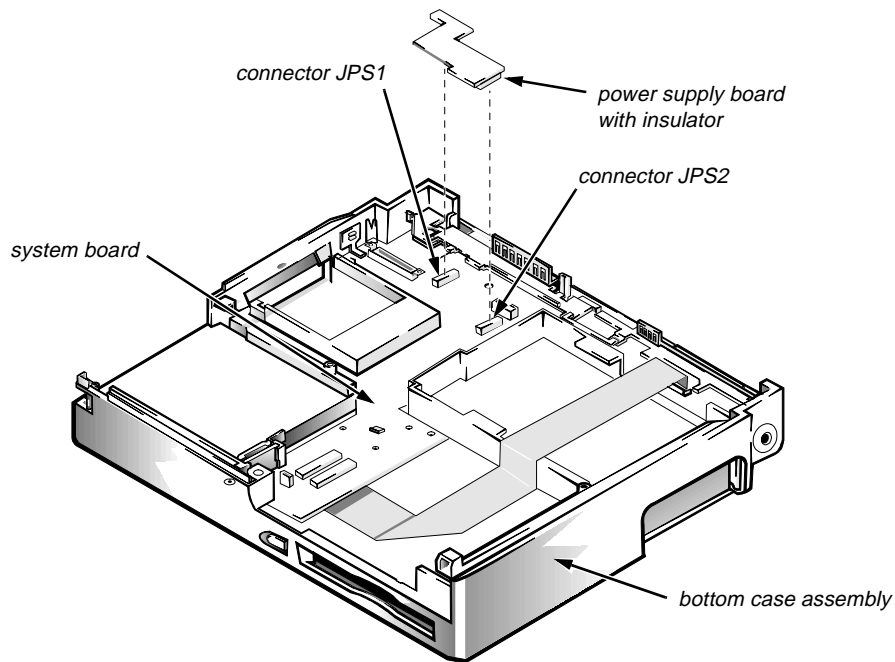


Figure 4-29. 3.1-V Power Supply Board Removal

Part or Assembly Name	Order Name
3.1-V power supply board	CRD,PWR SPLY,LXPiCD,V3.1,NBK

To remove the 3.1-V power supply board, follow these steps:

- 1. Remove the palmrest assembly**
- 2. Remove the superpart assembly.**
- 3. Remove the 3.1-V power supply board from the system board.**

The power supply board is held in place on the system board by connectors JPS1 and JPS2.

I/O-Panel Dust Cover

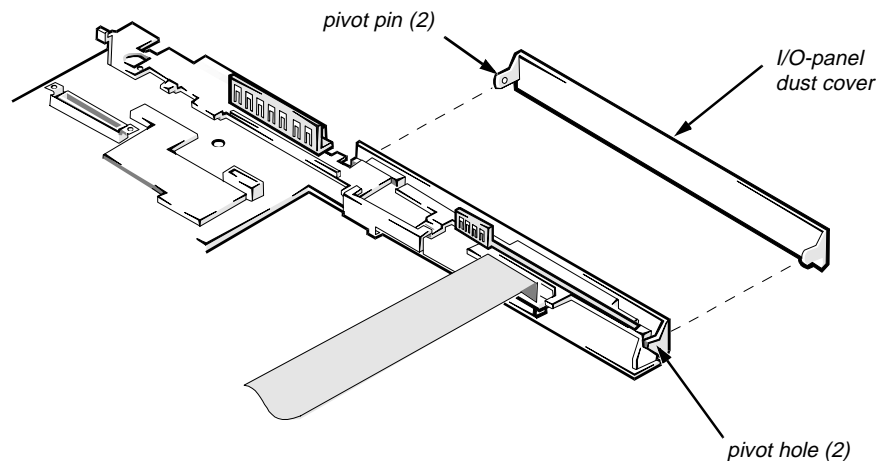


Figure 4-30. I/O-Panel Dust Cover Removal

Part or Assembly Name	Order Name
I/O-panel dust cover	DOOR,PLSTC,I/O,LXP/NBK

To remove the I/O-panel dust cover, follow these steps:

1. **Remove the palmrest assembly.**
2. **Remove the display assembly.**
3. **Remove the superpart assembly.**
4. **Remove the system board.**
5. **Remove the I/O-panel dust cover.**

Push outward on one end of the dust cover to release the pivot pin from its associated pivot hole. Then repeat the operation for the other end of the cover. After both ends have been disengaged, lift the dust cover away from the system board assembly.

To replace the I/O-panel dust cover, orient the cover in its original position and snap the pivot pins into place in their associated pivot holes. Make sure the dust cover opens and closes freely before you reinstall the display assembly.

Advanced Port Replicator Connector Dust Cover

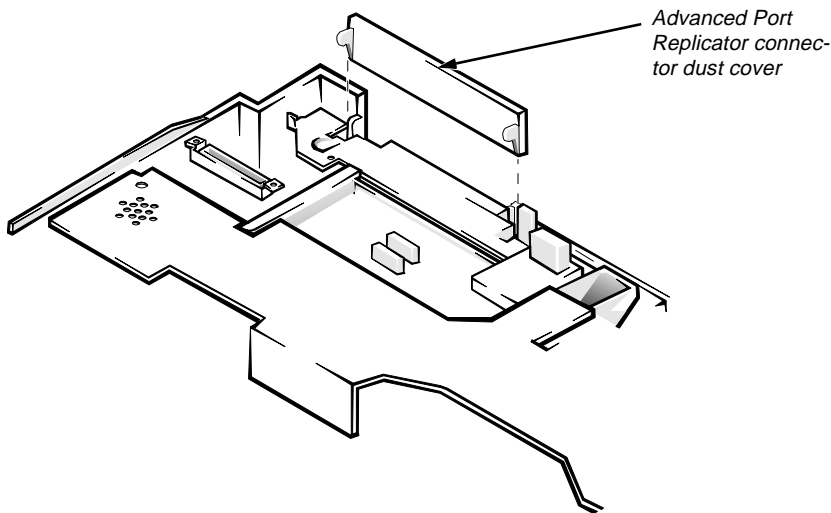


Figure 4-31. Advanced Port Replicator Connector Dust Cover

Part or Assembly Name	Order Name
Advanced Port Replicator connector dust cover	CVR,DOOR,DOCKING,LXP

To remove the dust cover for the Advanced Port Replicator connector, follow these steps:

- 1. Remove the palmrest assembly.
- 2. Remove the display assembly.
- 3. Remove the dust cover.

Audio Board

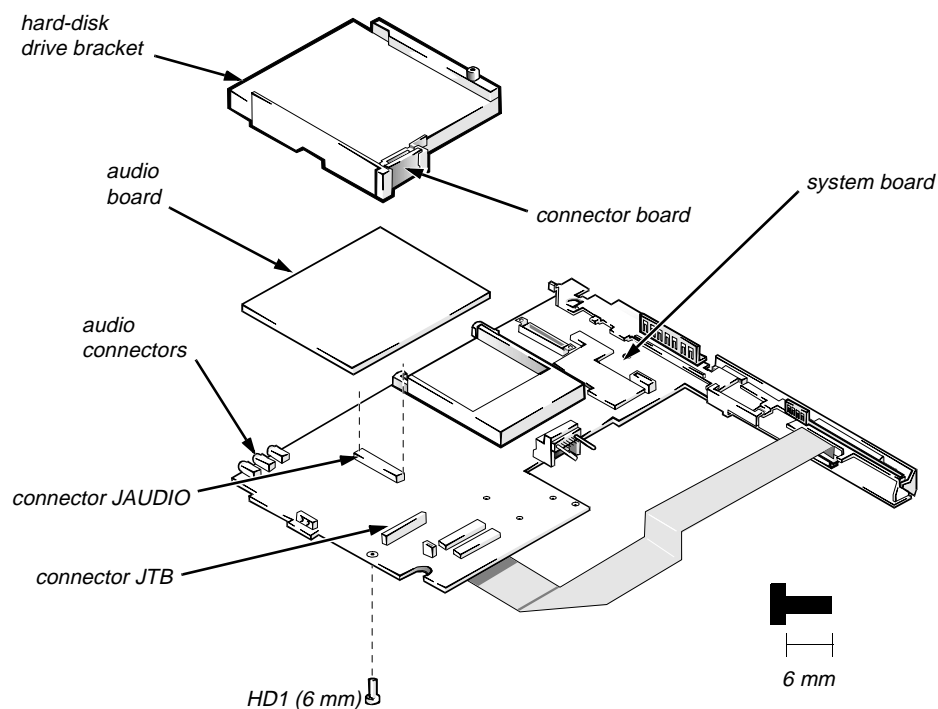


Figure 4-32. Audio Board Removal

Part or Assembly Name	Order Name
Audio board	PWA,AUDIO,LXPiCD,NBK

To remove the audio board, follow these steps:

1. **Remove the palmrest assembly.**
2. **Remove the display assembly.**
3. **Remove the superpart assembly.**
4. **Remove the system board.**
5. **Remove the hard-disk drive bracket.**

Turn the system board over and place it on a flat work surface. Remove screw HD1, which secures the bracket to the system board. Turn the system board over so that the bracket is on the top. Use a plastic scribe or a small flat-blade screwdriver to pry the bracket from connector JTB. Gently push the bracket outward from the system board until the bracket is disengaged from the audio connectors, and lift the bracket away from the system board.

6. **Lift the audio board straight up from the system board.**

The audio board is held in place on the system board by connector JAUDIO.

Appendix A

Factory Repair Parts

This appendix provides procedures for removing and replacing factory components and subassemblies at a service facility. (Dell does not recommend removal and replacement of factory components and subassemblies in the field. For removal and replacement procedures for field-replaceable parts, see Chapter 4, “Removing and Replacing Parts.”)

Recommended Tools

Most of the procedures in this appendix require the use of one or more of the following tools:

- Small flat-blade screwdriver
- Jeweler’s screwdriver set
- Number 1 magnetized Phillips-head screwdriver
- Number 2 magnetized Phillips-head screwdriver
- Chip-removal tool
- Wrist grounding strap
- Small plastic scribe
- Nut drivers

Precautionary Measures

Before you begin working on the computer, read about the precautionary measures, screw identification, and computer orientation outlined at the beginning of Chapter 4, “Removing and Replacing Parts.”

Factory Repair Parts and Assemblies

Table A-1 lists the factory repair parts and assemblies available for the computer. The subsections that follow Table A-1 provide instructions for removing and replacing these parts and assemblies.

Table A-1. Factory Repair Parts and Assemblies

Part or Assembly Name	Order Name	Figure
AC Adapter and Power Cords		
AC adapter	ADPT,AC,EXT,18V,65W,LXP	
Power cable, U.S.	CORD,PWR,110V,6F,AC ADPT,US	
Power cable, Europe	CORD,PWR,220V,6F,AC ADPT,EUR	
Power cable, Australia	CORD,PWR,220V,6F,AC ADPT,AUS	
Power cable, U.K.	CORD,PWR,220V,6F,AC ADPT,UK	
Audio		
Audio board service kit	SVC,ASSY,AUD BD/SPKR, LXPi+	4-32
Microphone service kit	SVC,ASSY,MIPHN,LXPi+CD	4-21
Microphone/switch assembly	ASSY,MIPHN/SWT,LXPi+CD	4-21
Magnet switch	SWT,MGNT,ENCL,SPST, LXPiCD	4-21
Microphone/switch cable	CBL,FPC,MIC/SW,LCD,12.1"	4-21
Technical booklet	DOC,SERV,GDE,XPi+	
Batteries		
Reserve battery	SVC,BTRY,RSRV,LXP	4-26
Battery, reserve	BTRY,RSV,LXP	
Technical booklet	TSH,SERV,LXP	

Table A-1. Factory Repair Parts and Assemblies (Continued)

Part or Assembly Name	Order Name	Figure
Batteries (Continued)		
Main battery assembly	CUS,BTRY,SAR,36WHR,LXP	4-2
Main battery	BTRY,MAIN,36WH,LXP/XPi	
Technical booklet	TSH,BTRY,LXP	
CD-ROM Drive Assembly		
CD-ROM drive assembly	SVC,ASSY,CD,LXPiCD	4-23
CD-ROM bezel	BZL,CD,PLSTC,LXPiCD	
CD-ROM bezel assembly	SUBASSY,BZLPLSTC,CD,LXPiCD	
CD-ROM bezel spring	SPR,FL,CLP,CD BZL,LXPiCD	
CD-ROM drive	CD,627M,I,INT,CC,LXPiCD	
CD-ROM drive cable	CBL,FPC,CD,LXPiCD	
Eject button	BTN,EJCT,CD,LXPiCD	
Screws, diskette/CD-ROM drive bracket	SCR,M2X2MM,PHH,MS,ZPS,NBK	
Diskette Drive Assembly		
Diskette drive assembly	SVC,ASSY,FD,LXPiCD	4-23
Diskette drive	FD,1.44M,F3,LXPiCD	
Diskette drive cable	CBL,FPC,FD,LXPiCD	
Eject button	BTN,EJCT,FD,LXPiCD	
Technical booklet	DOC,SERV,GDE,XPi+	
Screws, diskette/CD-ROM drive bracket	SCR,M2X2MM,PHH,MS,ZPS,NBK	

Table A-1. Factory Repair Parts and Assemblies (Continued)

Part or Assembly Name	Order Name	Figure
Diskette Drive Assembly (Continued)		
Diskette/CD-ROM drive assembly	SUBASSY,FD/CD,LXPiCD	4-23
Diskette/CD-ROM bracket	BRKT,FD,AL,RT,LXPiCD	4-23
Hard-Disk Drive Assemblies		
Hard-disk drive assembly	CUS,HD, xxxxx,yy,MM,zzz, LXP*	4-6
Hard-disk drive, subassembly	SUBASSY,HD,xxxxx,yy,MM, zzz,LXP*	
Hard-disk drive	HD,xxxxx,yy,MM,zzz,REV2*	
Hard-disk drive bracket	BRKT,HD,LXP	
Hard-disk drive mounting screws	SCR,M3X4,BIND/PHH,BL OXIDE	
Hard-disk drive insulator	INSUL,yyMM,LXP*	
Technical booklet	TSH,HD,LXP	
Keyboards		
Keyboard assembly, Belgium	KYBD,86,BEL,ALPS,LXPi+	4-5
Keyboard assembly, China	KYBD,85,CHINA,ALPS, LXPi+	4-5
Keyboard assembly, domestic	SVC,KYBD,85,DOM,LXPi+	4-5
Keyboard assembly, Danish	KYBD,86,DEN,ALPS,LXPi+	4-5
Keyboard assembly, French	KYBD,86,FR,ALPS,LXPi+	4-5

* Substitute your drive capacity for xxxxx, your drive height for yy, and the manufacturer for zzz.

Table A-1. Factory Repair Parts and Assemblies (Continued)

Part or Assembly Name	Order Name	Figure
Keyboards (Continued)		
Keyboard assembly, French/Canadian	KYBD,85,FR,CAN,ALPS,LXPi+	4-5
Keyboard assembly, German	KYBD,86,GER,ALPS,LXPi+	4-5
Keyboard assembly, Japan	KYBD,87,JPN,LXPi+	4-5
Keyboard assembly, Korean	KYBD,85,KOREA,ALPS,LXPi+	4-5
Keyboard assembly, Latin	KYBD,86,LTN,ALPS,LXPi+	4-5
Keyboard assembly, Norwegian	KYBD,86,NOR,ALPS,LXPi+	4-5
Keyboard assembly, Russian	KYBD,86,RUS,ALPS,LXPi+	4-5
Keyboard assembly, Spanish	KYBD,86,SPN,ALPS,LXPi+	4-5
Keyboard assembly, Swedish	KYBD,86,SWE,ALPS,LXPi+	4-5
Keyboard assembly, Swiss	KYBD,86,SWI,ALPS,LXPi+	4-5
Keyboard assembly, Thailand	KYBD,85,THAI,ALPS,LXPi+	4-5
Keyboard assembly, U.K.	KYBD,84,UK,LXPi+	4-5
LCD Assemblies		
LCD panel, LCD inverter board, active-matrix color, TFT SVGA display	SVC,LCD/INVTR,TFT, LXPi+CD	
LCD panel	LCD,TFT,SVGA,12.1", SAMSUNG	4-17
LCD inverter board	ASSY,BD,INVTR,TFT,SVGA, 12.1"	4-17
Technical booklet	DOC,SERV,GDE,XPi+	

Table A-1. Factory Repair Parts and Assemblies (Continued)

Part or Assembly Name	Order Name	Figure
LCD Assemblies (Continued)		
LCD/LED/inverter board cable, service kit, active-matrix color, TFT SVGA display	SVC,CBLS,LCD,TFT,SAM-SUNG,LXPi+CD	
Display-assembly interface cable	CBL,FPC,LED/INVRTR,TFT, 12.1"	4-20
Display-assembly interface cable bobbin, 12.1-inch	BBN,LCD,TFT,12.1"	4-20
Technical booklet	DOC,SERV,GDE,XPi	
Bezel service kit, 12.1-inch	SVC,BZL,LCD,TFT,LXPiCD	4-15
Display assembly bezel 12.1-inch	ASSY,LCD,BZL,12.1"	4-15
Display-assembly latch spring	SPR,LTCH	4-16
Technical booklet	DOC,SERV,GUIDE,LXPi	
Display case service kit, 12.1-inch	SVC,CVR,BK,TFT,LXPi+	
Display assembly case, 12.1-inch	ASSY,LCD,CVR,BK,TFT,12.1"	4-17
Technical booklet	DOC,SERV,GUIDE,LXPi	
Display assembly latch service kit, 12.1-inch	SVC,LTCH,DIS,TFT,LXPi+	
Display assembly latch, 12.1-inch	LTCH,LCD,STN/TFT,LXP	4-16
Display-assembly latch spring, 12.1-inch	SPR,LTCH	4-16
Technical booklet	DOC,SERV,GUIDE,LXPi	

Table A-1. Factory Repair Parts and Assemblies (Continued)

Part or Assembly Name	Order Name	Figure
LCD Parts		
Hinge cover, right	CVR,HNG,RT,MIPHN,LXPi+	4-21
Hinge cover, left	CVR,HNG,LXP	
Display assembly base	ASSY,CVR,BTM,DIS,LXPiCD	4-19
Left hinge	HNG,LCD,LFT,TFT,12.1"	4-15
Right hinge	HNG,LCD,RT,TFT,12.1"	4-19
Display-assembly-bezel retaining screw covers, lower	CVR,LCD,LWR,LXPiCD	4-15
Display-assembly-bezel retaining screw covers, upper	BMPR,UPR,LCD,LXPiCD	4-15
Display-assembly EMI shield 12.1-inch	SHLD,LCD,MET,TFT,12.1"	A-4
Memory		
Memory module, 4-MB, customer kit	CUS,MEM,4M,LXP4D/T, LXPi	4-9
Memory module, 4-MB	SIMM,4MB,LXP	
Technical booklet	TSH,DIMM INSTL,LXP	
Memory module, 8-MB, customer kit	CUS,MEM,8M,LXP4D/T, LXPi	4-9
Memory module, 8-MB	DIMM,8M,2X32,TL,LXP	
Technical booklet	TSH,DIMM INSTL,LXP	
Memory module, 16-MB, customer kit	CUS,MEM,16M,LXP4D/T, LXPi	4-9
Memory module, 16-MB	SIMM,16MB,LXP	
Technical booklet	TSH,DIMM INSTL,LXP	

Table A-1. Factory Repair Parts and Assemblies (Continued)

Part or Assembly Name	Order Name	Figure
Miscellaneous Parts		
CD-ROM EMI clip	CLP,EMI,CD,LXPiCD	4-5
Keyboard EMI clip	CLP,EMI,KYBD,LXPiCD	4-5
Superpart serial EMI clip	CLP,EMI,SER,SUPERPRT, I/O,LXPiCD	4-5
Superpart docking EMI clip	CLP,EMI,DOCK,SUPERPRT, I/O,LXPiCD	4-5
Memory compartment cover	CVR,MEM,LXPiCD	4-7
PCMCIA blank	INSR,BLNK,PCMCIA,LXP	4-5
PCMCIA blank, type III	INSR,BLNK,PCMCIA, TYP 3,LXPiCD	4-5
Tilt-support-foot retaining screw cover	CVR,REAR,FOOT,LXP	4-12
Advanced Port Replicator connector dust cover	CVR,DOOR,DOCKING,LXP	4-31
Tilt-support foot, left	FOOT,PLSTC,REAR,LF, LXPiCD	4-5
Tilt-support foot, right	FOOT,REAR,RT,LXP	4-5
I/O panel dust cover	DOOR,PLSTC,I/O,LXP/NBK	4-30
Main battery insulator	CVR,MYLAR,BTRY,CVTY, LXPiCD	A-10
I/O bracket, hinge	GSKT,I/O BRKT,BTM,EMI, LXPi	
Superpart assembly	SVC,ASSY,FAN/SPKR, BRKT,LXPiCD	4-33
Spreader plate	PLT,SPRDR,BTM,LXPiCD	A-12
Spreader plate spacer	SPCR,TOP SPRDR,PORON, LXPiCD	A-12

Table A-1. Factory Repair Parts and Assemblies (Continued)

Part or Assembly Name	Order Name	Figure
Miscellaneous Parts (Continued)		
Keel plate	ASSY,PLT,KEEL,LXPiCD	A-12
Deck buoy	ASSY,CLMP,THRM,LXPiCD	4-24
Microphone insulator bracket	INSUL,PLSTC,MIPHN/ SWT,LXPiCD	
Bottom case assembly	CVR,BTM,BLK,LXPi	4-22
Power button	BTN,PWR SWT,LXP	A-11
Power-button mounting bracket	GDE,PWR SWT,PLSTC,LXPi	A-11
Memory compartment cover	CVR,MEM,LXPi+CD	4-5
Palmrest Assembly		
Palmrest service kit	SVC,ASSY,PLMRST, LXPi+CD	
Palmrest assembly	SUBASSY,PLMRST,LXPi+CD	4-9
Technical booklet	DOC,SERV,GUIDE,LXPiCD	
Screws		
Screws service kit	SVC,SCR,LXP	
3 mm, black	SCR,2mmX3mm,PHH,MS, BLO,LXP B2	
3 mm, gold	SCR,2mmX3mm,PHH,MS, NON,LXP B8	
4 mm, black	SCR,2.6mmX4mm,PHH,MS, BLO,LXPB7	
5 mm, black	SCR,2.6mmX5mm,PHH,MS, BLO,LXPB3	
5 mm, gold	SCR,2.6mmX5mm,PHH,MS, NON,LXP B8	

Table A-1. Factory Repair Parts and Assemblies (Continued)

Part or Assembly Name	Order Name	Figure
Screws (Continued)		
6 mm, black	SCR,2mmX6mm,PHH,MS, BLO,LXP B6	
8 mm, gold	SCR,2.6mmX8mm,PHH,MS, ZPS	
10 mm, gold	SCR,2.5mmX10mm,PHH,MS, NON,LXP5	
10 mm, black	SCR,2mmX10mm,PHH,MS, BLO,LXP B9	
10 mm, black	SCR,M2X.4x10mm,PHH, MS,BLO	
25 mm, black	SCR,2.6mmX25mm,PHH,MS, BLO,LXP1	
System Board Assemblies		
System board assembly, LXPi CD, 150-MHz, service kit	SVC,SYS,PLN, LXPiCD- P150ST,WB,0M	4-27
System board sub- assembly, LXPi CD, 150-MHz	ASSY,PLN,LXPiCD-150ST, WB,0M	
BIOS access door	CVR,PLSTC,BIOS,LXPiCD	
BIOS chip	IC,EEPROM,256X8,150NS, PLCC	
Audio board	PWA,AUDIO,LXPiCD,NBK	4-32
Hard-disk drive bracket	BRKT,GDE,HD,LXP	4-32
Connector board, hard- disk drive	PWA,HD CON,LXPiCD,NBK	4-32
Power supply board	CRD,PWR SPLY,LXPiCD, V3.1,NBK	4-29

Table A-1. Factory Repair Parts and Assemblies (Continued)

Part or Assembly Name	Order Name	Figure
System Board Assemblies (Continued)		
System board, 150-MHz	PWA,PLN,LXPiCD-150ST, NBK	
I/O interface cable	CBL,I/O TO M/B,LXPiCD	A-7
Bracket, I/O	BRKT,I/O,LXPi	
Serial EMI clip, I/O	CLP,EMI,SER,I/O,XPiCD	
Docking EMI clip, I/O	CLP,EMI,DOCK,I/O,XPiCD	
Diskette, field service	DSK,FLD SERV,F3,US, LXP	
Technical booklet, service	DOC,SERV,GUIDE,LXPi	
Trackball		
Optical trackball assembly	SVC,ASSY,TBALL/SWT, LXPi+CD	4-11
Trackball interface cable	CBL,TBALL,LXPi+CD	4-11
Trackball subassembly	SUBASSY,TBALL,OPTICAL, LXPiCD	
Trackball board	PWA,TBALL,OPTICAL, LXPiCD	A-2
Trackball	TBALL,OPTICAL,LXPiCD	A-2
Trackball button board	SUBASSY,TBALL,SWT BD, LXPiCD	A-2
Technical booklet	DOC,SERV,GUIDE,LXPi	

Exploded Views of Components and Assemblies

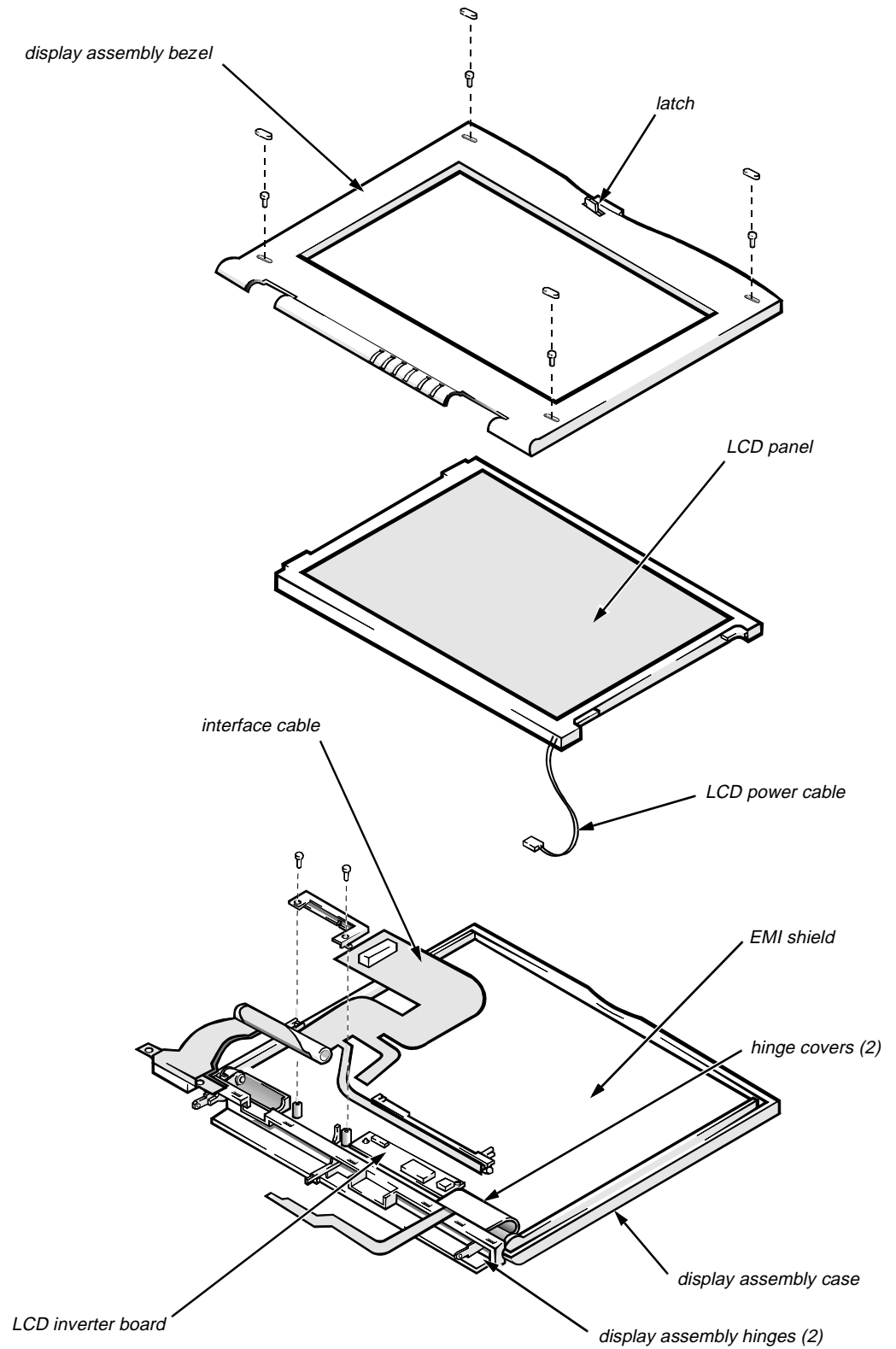


Figure A-1. Exploded View—Display Assembly

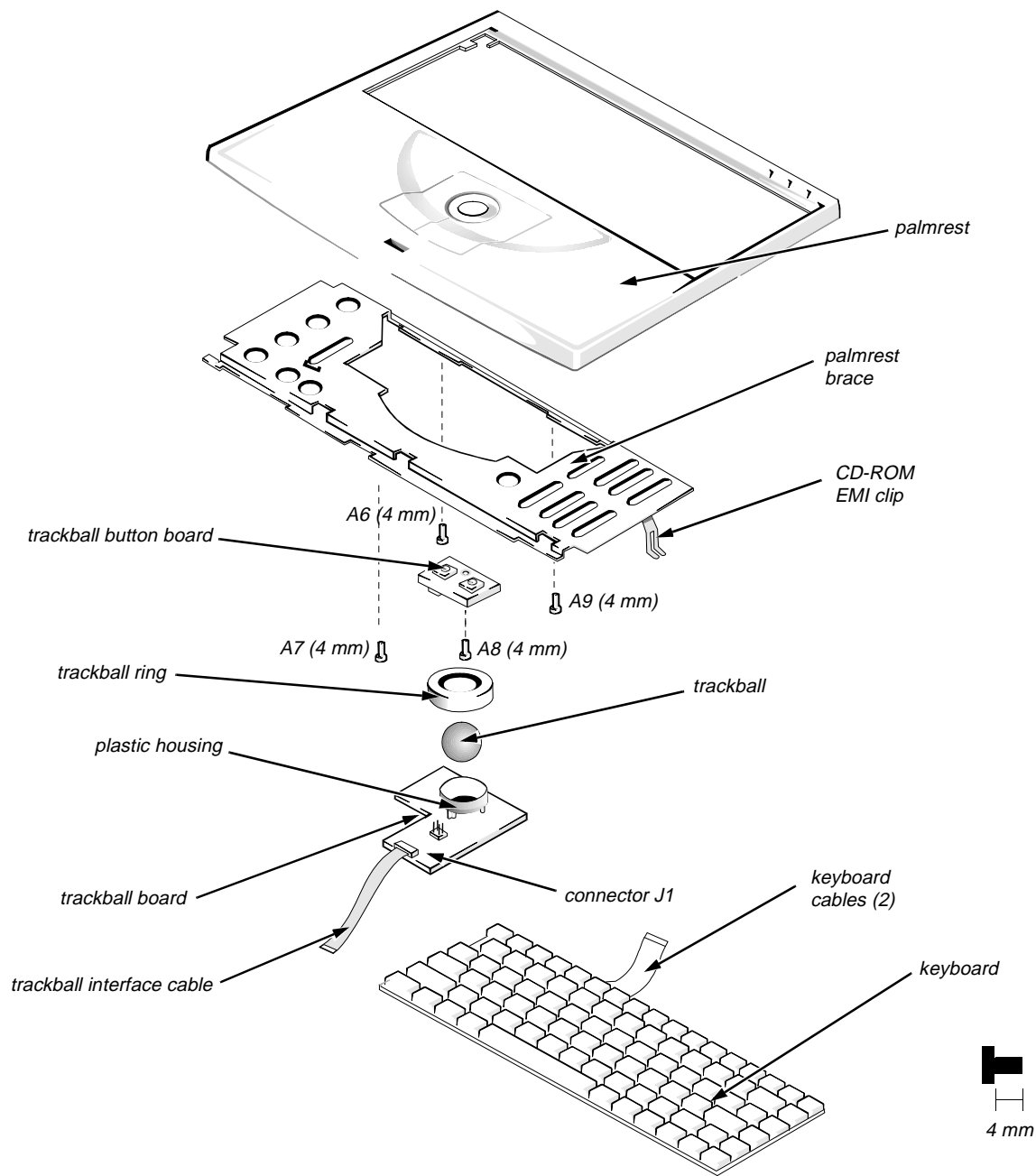


Figure A-2. Exploded View—Palmrest Assembly

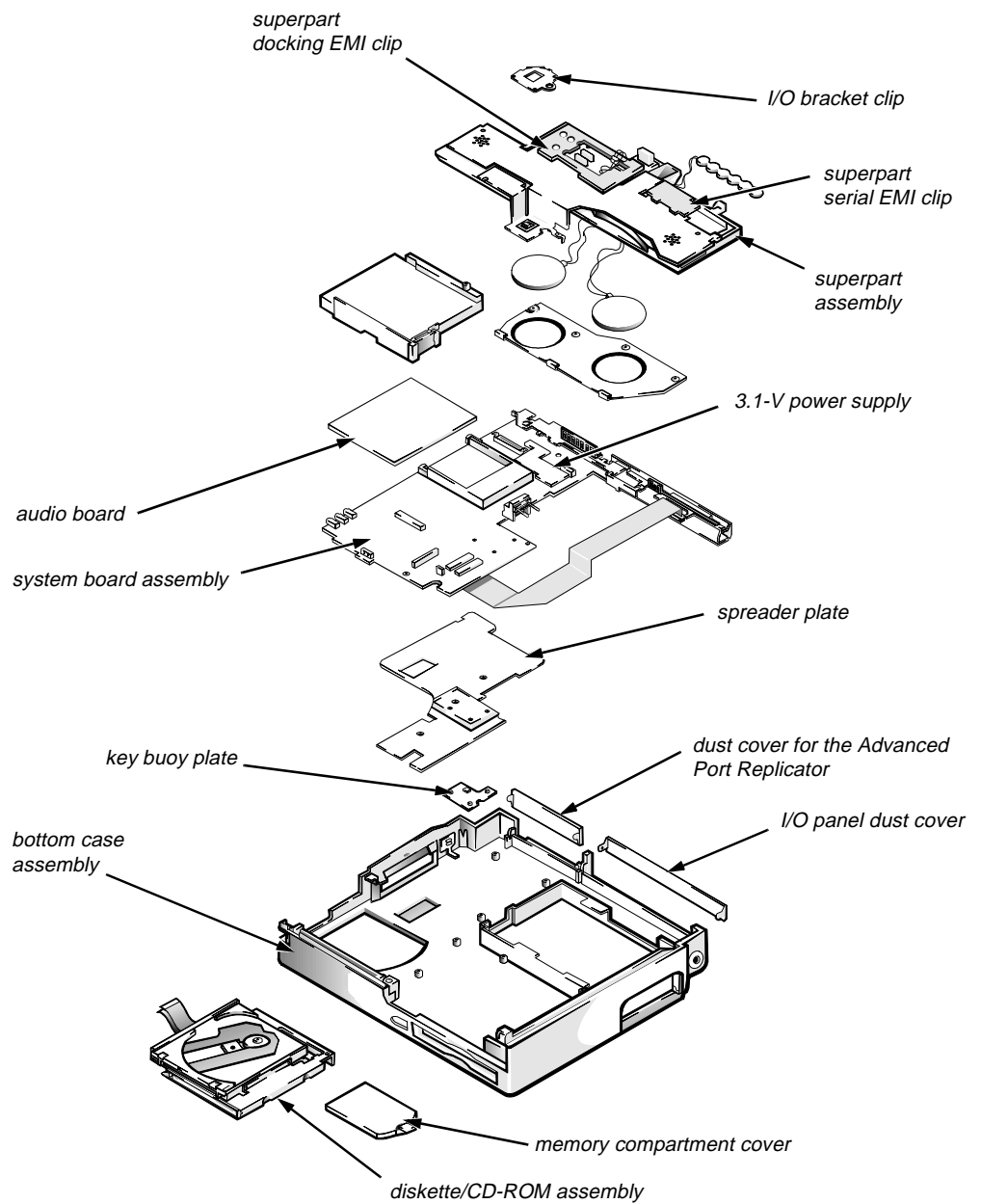


Figure A-3. Exploded View—Bottom Case Assembly

Hard-Disk Drive

The hard-disk drive resides in a carrier that mounts inside the computer's hard-disk drive bay. Four screws secure the drive inside the carrier. A mylar insulator provides electrical insulation between the hard-disk drive and the bottom of its carrier. To remove the hard-disk drive and hard-disk drive insulator, follow these steps:

1. Remove the hard-disk drive assembly.

See "Hard-Disk Drive Assembly" in Chapter 4.

2. Place the hard-disk drive assembly right side up on the work surface, and remove the four screws that secure the drive in its carrier.

CAUTION: Rotating the hard-disk drive too far can damage the short flex cable that connects the hard-disk drive to the system board's hard-disk drive interface connector. Do *not* rotate the drive farther than necessary to disconnect the cable from the back of the drive.

3. Rotate the front of the drive toward the back of the carrier far enough to expose the connector on the back of the drive.

4. Carefully pry the flex cable connector away from the hard-disk drive interface connector on the back of the drive.

5. Lift the hard-disk drive out of its carrier.

6. Remove the hard-disk drive insulator, if necessary.

With the hard-disk drive removed, lift the insulator straight up out of the carrier. The 17-mm hard-disk drives also have a foam spacer on top of the insulator (not shown).

To avoid possible damage to components on the hard-disk drive's integrated controller board, hold the drive at approximately a 45-degree angle while reattaching the interface cable. Then rotate the drive toward the front of its carrier until it is seated in its original position.

CD-ROM Drive

The CD-ROM drive is attached to the CD-ROM/diskette drive bracket. See “Diskette/CD-ROM Drive Assembly” in Chapter 4 for instructions about removing the diskette/CD-ROM assembly from the bottom case assembly. The CD-ROM flex cable is threaded through a slot in the drive bracket. Remove the four screws that hold the CD-ROM to the drive bracket. Slide the CD-ROM flex cable out of the slot in the bracket holding the CD-ROM. The CD-ROM is replaced as a unit and is not disassembled.

Diskette Drive

The diskette drive is attached to the CD-ROM/diskette drive bracket. See “Diskette/CD-ROM Drive Assembly” in Chapter 4 for instructions about removing the diskette/CD-ROM assembly from the bottom case assembly. Remove three screws to separate the diskette drive from the drive bracket. The diskette drive is replaced as a unit and is not disassembled.

Palmrest Assembly Components

To remove and replace a component of the palmrest assembly, you must first remove the assembly as described in “Palmrest Assembly” in Chapter 4. The subsections that follow provide removal procedures for the components of the trackball assembly. See Figure A-2.

Trackball

Turn the trackball board over. Rotate the retaining ring counter-clockwise. Lift the trackball out of the recess in the trackball holder.

Trackball Interface Cable

Gently disconnect the end of the cable from connector J1 on the trackball button board.

Trackball Button Board

Remove retaining screw A6 (see Figure A-2), and lift the board out of the palmrest assembly. When replacing the board, fit the two small switches on the underside of the board into the recesses in the palmrest.

Palmrest Brace

Remove screws A-7 through A-9 (see Figure A-2). Gently pull the brace toward the front, and lift the brace away from the palmrest.

Display Assembly Components

The display assembly consists of the LCD assembly and its related components. It also contains the LED board, which provides visual indications of many of the computer's basic functions. The microphone assembly is mounted inside the right hinge cover of the display.

Some parts of the display assembly can be removed and replaced without removing the assembly from the computer. Others require that the display assembly be removed. The following subsections describe the removal of display assembly parts.

Display-Assembly EMI Shield

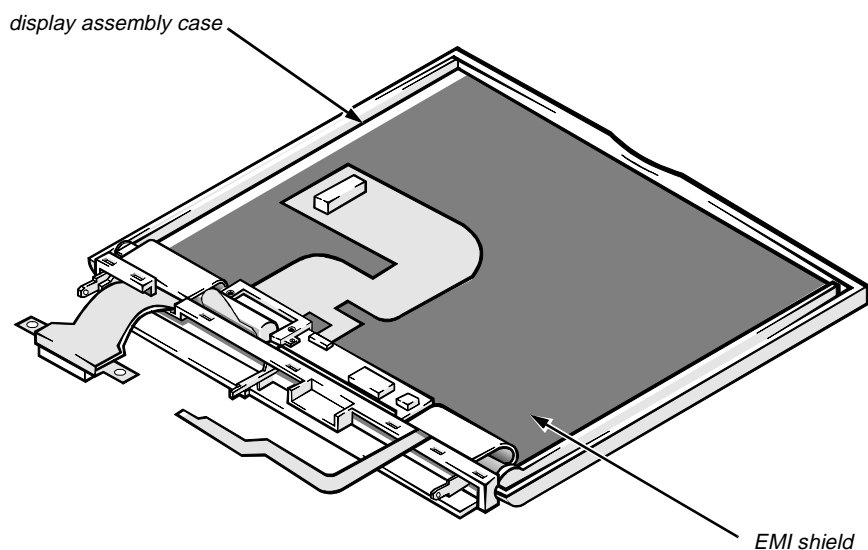


Figure A-4. Display-Assembly EMI Shield Removal

To remove the display-assembly EMI shield, follow these steps:

- 1. Remove the display assembly from the computer.**
See “Display Assembly” in Chapter 4.
- 2. Remove the display assembly bezel.**
See “Display Assembly Bezel” in Chapter 4.
- 3. Remove the LCD assembly.**
See “LCD Assembly” in Chapter 4.
- 4. Remove the display-assembly interface cable.**
See “Display-Assembly Interface Cable” in Chapter 4.

5. Remove the LCD-inverter-board.

See “LCD-Inverter-Board Interface Cable” in Chapter 4.

6. Remove the display assembly base.

See “Display Assembly Base” later in this chapter.

7. Remove the display-assembly EMI shield.

The EMI shield is held in place by tabs along the upper and lower edges. Pulling the center of the shield slightly away from the display assembly will release the tabs.

To replace an EMI shield, carefully orient the replacement EMI shield in the same position as the original shield. Make sure that all screw holes in the shield are aligned with their corresponding screw holes in the display assembly case.

Display Assembly Base

To remove the display assembly base (see Figure 4-14), follow these steps:

1. Remove the display assembly from the computer.

See “Display Assembly” in Chapter 4.

2. Remove both hinge covers.

See “Hinge Covers” in Chapter 4.

3. Rotate the display assembly hinges so that they point away from the display assembly at approximately 180 degrees.

4. Remove the display assembly bezel.

See “Display Assembly Bezel” in Chapter 4.

5. Remove the left hinge.

See the next subsection, “Display Assembly Hinges.”

6. Rotate the right end of the display assembly base away from the display assembly until the base clears the right hinge.

7. Lift the display assembly base away from the left hinge.

8. Disengage the display-assembly interface cable from the slot in the base.

Display Assembly Hinges

To remove a hinge (see Figure 4-14), follow these steps:

1. Remove the display assembly from the computer.

See “Display Assembly” in Chapter 4.

2. Remove the display assembly bezel.

See “Display Assembly Bezel” in Chapter 4.

3. Remove the LCD assembly.

See “LCD Panel” in Chapter 4.

4. Remove the display-assembly interface cable.

See “Display-Assembly Interface Cable” in Chapter 4.

5. Remove the hinge covers.

See “Hinge Covers” in Chapter 4.

6. Remove the display assembly base.

See the previous subsection, “Display Assembly Base.”

7. Rotate the display assembly hinges so that they point away from the display assembly case at approximately 180 degrees.

8. To remove the hinge, remove the screw securing the hinge to the display assembly case and disengage the hinge from the display assembly case.

System-Board Assembly Components

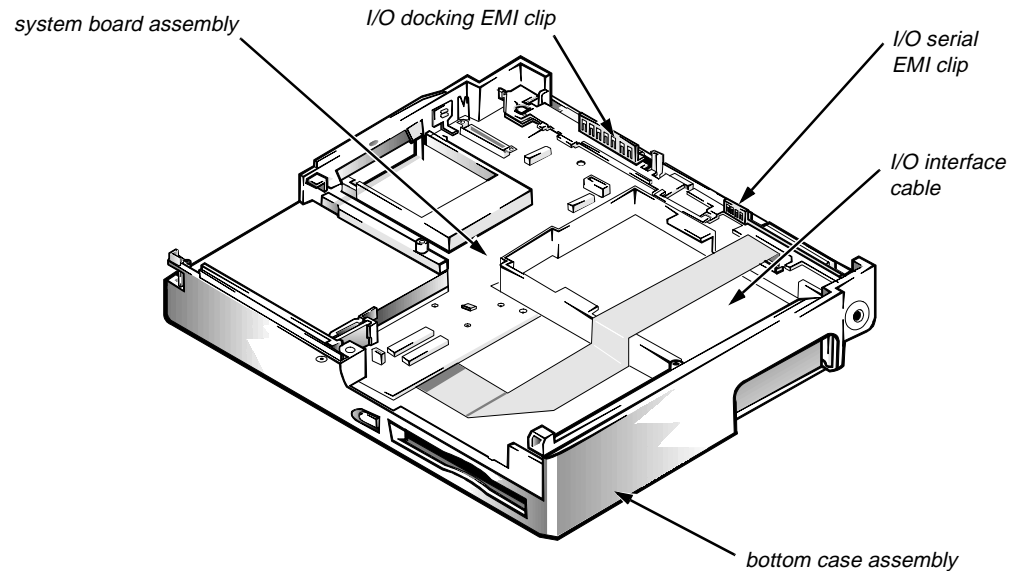


Figure A-5. System Board Assembly in the Bottom Case Assembly

To remove a part of the system board assembly, Dell recommends that you first remove the assembly as described in “System Board Assembly” in Chapter 4. Then follow the instructions described in the following subsections to remove parts of the system board assembly.

System Board

To remove and replace the system board, transfer the following items from the system board assembly to the replacement system board assembly:

- Any installed memory modules — See “Memory Modules” in Chapter 4.
- Keyboard/keypad/mouse connector shield — See the next subsection, “Keyboard/Keypad/Mouse Connector Shield.”
- I/O interface cable — See “I/O Interface Cable” found later in this appendix.
- I/O board — See “I/O Board” found later in this section.

Keyboard/Keypad/Mouse Connector Shield

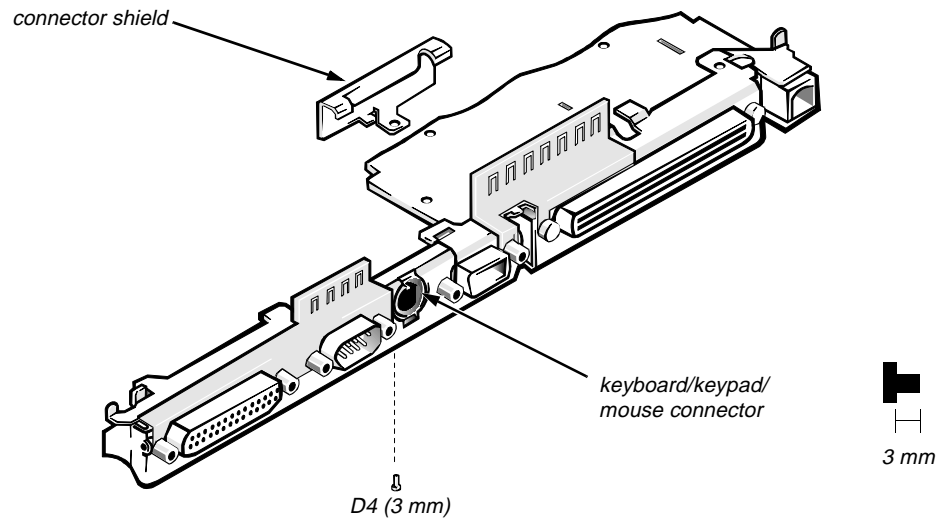


Figure A-6. Keyboard/Keypad/Mouse Connector Shield Removal

Two tabs on the keyboard/keypad/mouse connector shield engage two associated slots on the I/O panel near the keyboard/keypad/mouse connector. Retaining screw D4 attaches the bottom of the shield to the bottom of the I/O panel. To remove the shield, remove retaining screw D4, rotate the bottom of the shield toward the back of the system board assembly, and lift the shield off the I/O panel.

I/O Interface Cable

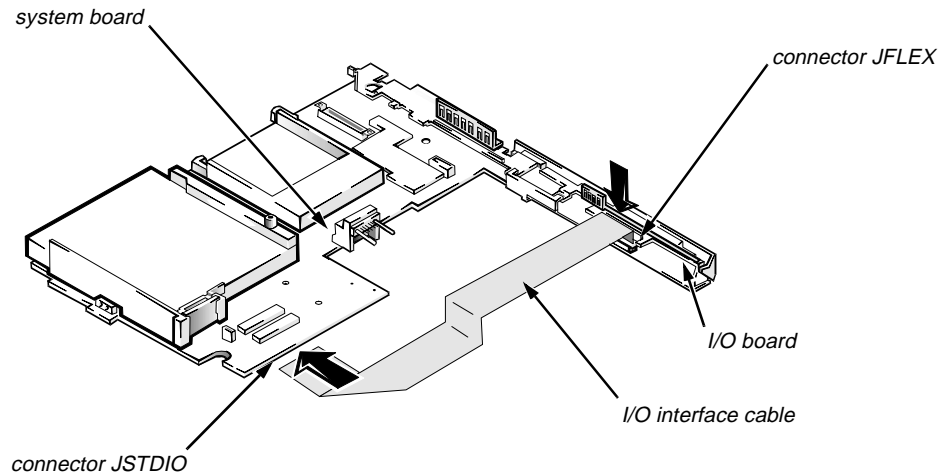


Figure A-7. I/O Interface Cable Removal

To remove the cable, follow these steps:

- 1. Disconnect one end of the I/O interface cable from connector JSTDIO on the system board.**
Connector JSTDIO is located on the underside of the system board.
- 2. Disconnect the other end of the I/O interface cable from connector JFLEX on the I/O board.**

I/O Board

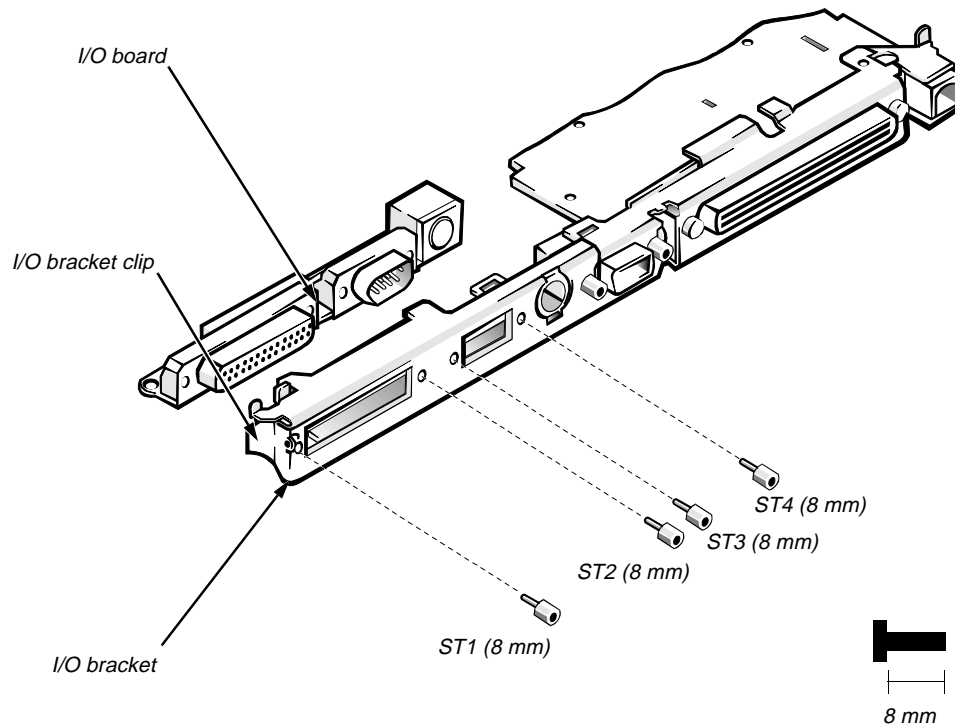


Figure A-8. I/O Board Removal

To remove and replace the I/O board, follow these steps:

1. Remove the I/O interface cable from connector JSTDIO.

See the previous subsection in this appendix.

2. Remove the keyboard/keypad/mouse connector shield.

See “Keyboard/Keypad/Mouse Connector Shield” found earlier in this appendix.

3. Remove the four hexagonal standoff screws ST1 through ST4 that secure the serial and parallel port connectors to the I/O panel.

Use a 3/16 nut holder to remove the standoff screws.

4. Remove the side I/O bracket clip.

See “System Board Assembly” in Chapter 4.

5. Lift the I/O board away from the I/O panel.

When replacing the I/O board, make sure that the side I/O bracket clip is positioned so that it rests directly on the I/O board, rather than between the I/O board and I/O bracket (see Figure A-8).

I/O Panel

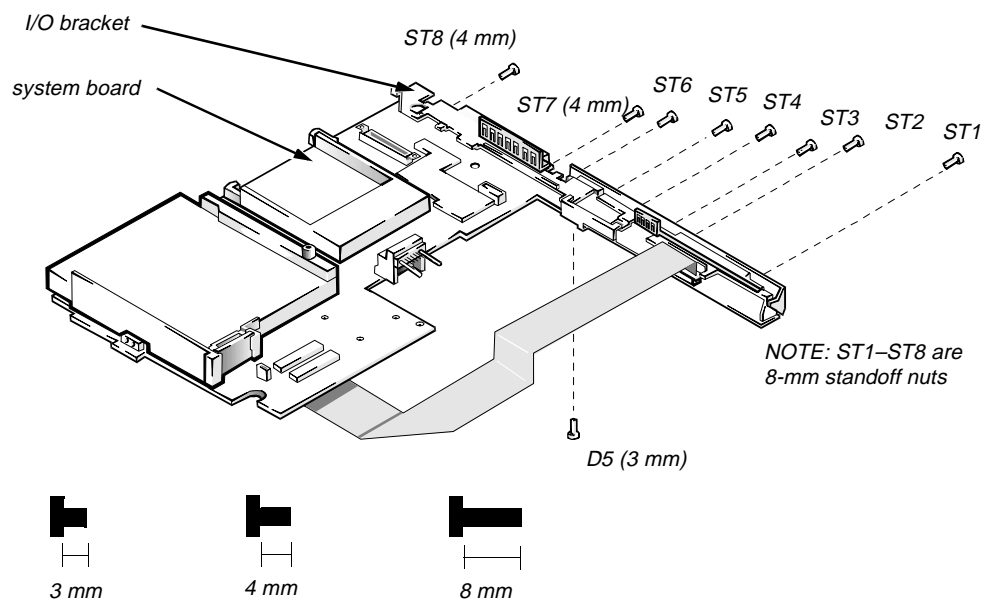


Figure A-9. I/O Panel Removal

To remove and replace the I/O panel, follow these steps:

1. Remove the I/O board.

See the previous subsection in this appendix.

2. Remove the standoff nuts ST1 through ST8

Use a 3/16 nut driver to remove standoff nuts ST1 through ST6 and a 7/32 nut driver for ST7 and ST8.

3. Remove screw D5.

4. Remove the I/O bracket from the system board.

Bottom-Case Assembly Components

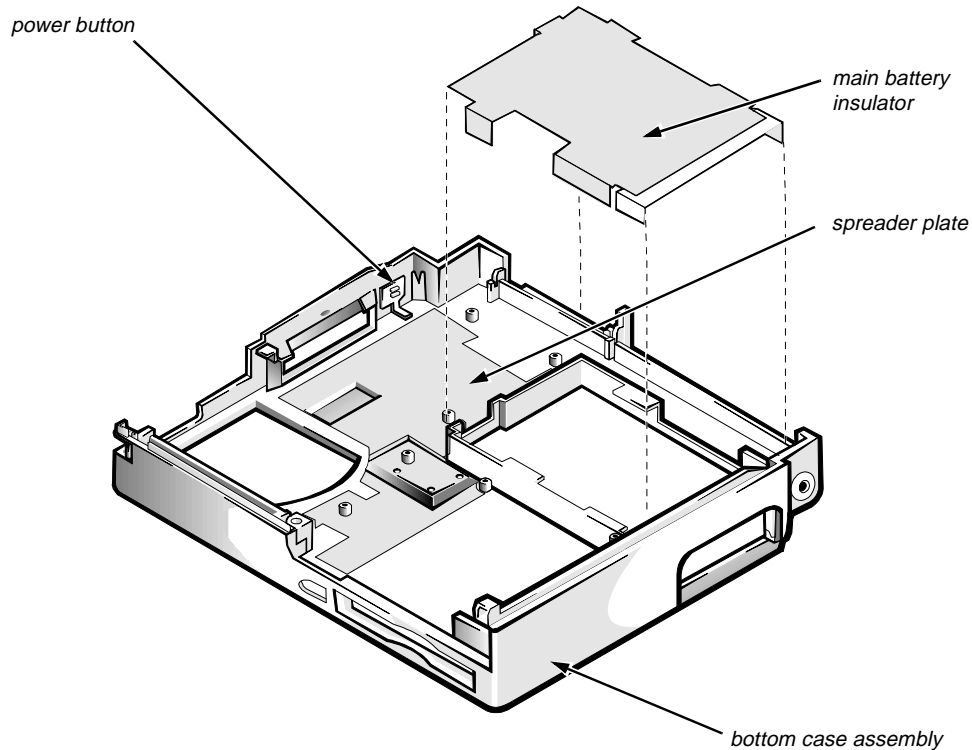


Figure A-10. Bottom-Case Assembly Components

To remove parts of the bottom case assembly, you must first remove the system board assembly as described in “System Board Assembly” in Chapter 4. The subsections that follow describe the removal and replacement of bottom-case assembly components.

Main Battery Insulator

The main battery insulator insulates the main battery from the system board assembly. To remove the main battery insulator, lift it off the main battery compartment.

NOTE: The main battery insulator sometimes comes out as part of the system board assembly. If this happens, follow the instructions in “System Board Assembly” in Chapter 4.

Power Button and Power-Button Mounting Bracket

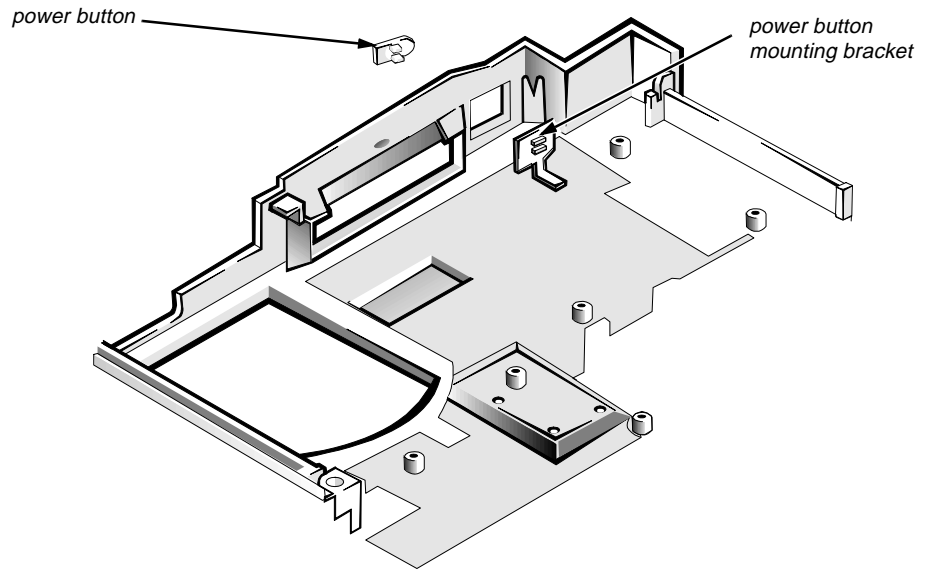


Figure A-11. Power Button and Power-Button Mounting Bracket Removal

Two tabs attach the power button to the power-button mounting bracket. To remove the power button and its mounting bracket, slide the power button as far as it will go toward the back of the bottom case assembly. Use a small flat-blade screwdriver or similar device to press the two tabs out of the mounting bracket. Lift the mounting bracket out of the bottom case assembly; then press the power button out of the hole in the side of the bottom case assembly.

Spreader and Keel Plates

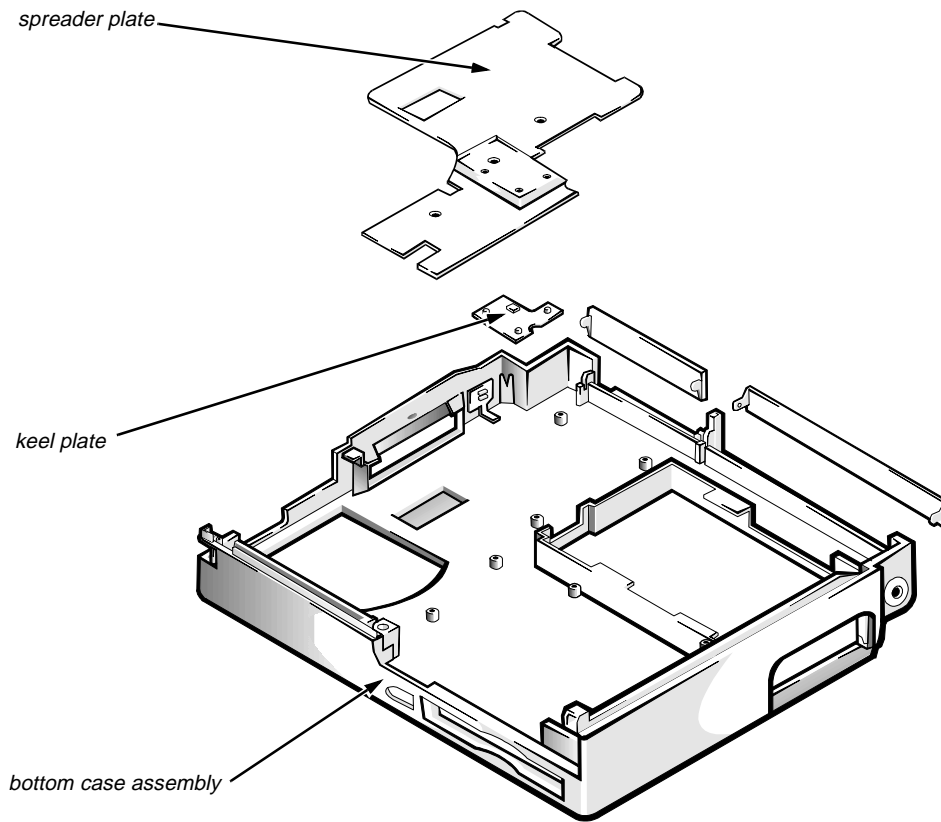


Figure A-12. Spreader and Keel Plate Removal

Remove the spreader plate by lifting it from the bottom case assembly. The spreader plate fits easily over plastic projections and screw holes. The keel plate is in the center of the bottom case, below the spreader plate. The keel plate fits over a small peg and a semicircular plastic projection. Remove the keel plate by lifting it out of the bottom case assembly.

Appendix B

System Setup Options

You may want to customize the configuration of your computer. This appendix describes how to change the system setup options stored in NVRAM on the system board.

You can access these options in two ways:

- Using the Dell Control Center
- Using the MS-DOS–based version of the system setup options, called the System Setup program

Accessing the Dell Control Center

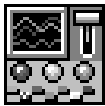


Figure B-1. Dell Control Center Icon

To access system setup options, double-click the Dell Control Center icon in the Dell Accessories program group in Windows.

Each button in the Dell Control Center window corresponds to a particular group of system setup options. The Dell Control Center has a detailed help file that explains each setup option.

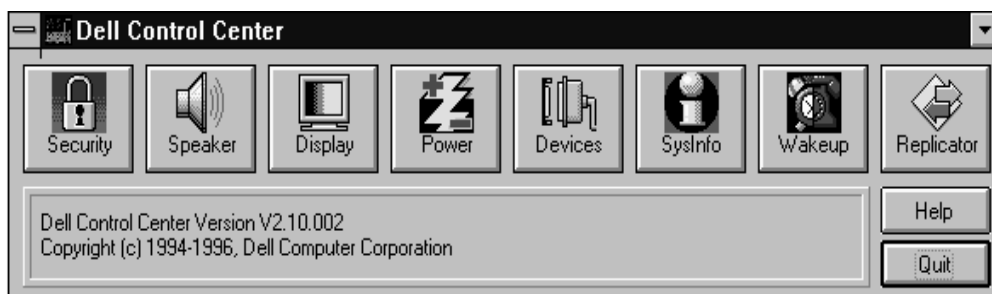


Figure B-2. Dell Control Center Window

Accessing the System Setup Program

NOTE: If the System Setup program is running when the computer enters suspend mode, the computer exits the System Setup program and then activates suspend mode.

To enter the System Setup program, hold down the <CTRL> and <ALT> keys and press the <ENTER> key, or press the <FN> and <F1> keys.

System Setup Screens

Dell Computer Corporation		
Page 1 of 2	Dell Latitude XPi CD System Setup	BIOS Version: AXX XXX
Time: 13:17:02	Date: Mon Feb 12, 1997	<p>This category sets the time in 24-hour format (hours:minutes:seconds) for the internal clock/calendar.</p> <p>To change the value in a field, enter digits or use the left- or right-arrow key to decrease or increase the value.</p> <p>Changes take effect immediately.</p>
Internal Hard Drive: 1216 MB	Diskette Drive A: 3.5 inch, 1.44 MB	
Boot Speed: 150 MHz	Boot Sequence: Diskette First	<p>Microprocessor: Pentium-150</p> <p>System Memory: 16 MB</p> <p>Video Memory: 1.1 MB</p> <p>External Cache: 256 KB</p> <p>Expansion Device: Not installed</p> <p>Service Tag: XXXXX</p> <p>Asset Tag: XXXXX</p>
Speaker Volume: High	Keyboard Click: Disabled	
Serial Port: COM1	Infrared Data Port: Disabled	
Parallel Mode: Bidirectional	Integrated Trackball: Enabled	
Upper PC Card Socket: Not installed	Lower PC Card Socket: Not installed	
Monitor Toggle: Enabled	Replicator SCSI: Enabled	
Replicator Network: Enabled	Ring Speed: 16 mbps	
Tab,Shift-Tab change fields ← → change values Alt-P next Esc exit Alt-B reboot		

Dell Computer Corporation			
Page 2 of 2	Dell Latitude XPi CD System Setup		BIOS Version: AXX
BATTERY		AC	When set to DISABLED, this category disables all power management features. The default setting is ENABLED. A change in this category takes
Power Management:	Enabled	Disabled	
Display Time-Out:	4 minutes	Disabled	Microprocessor: Pentium-150 System Memory: 16 MB Video Memory: 1.1 MB External Cache: 256 KB Expansion Device: Not installed Service Tag: XXXXX Asset Tag: XXXXX
Disk Time-Out:	1 minute	Disabled	
Suspend Time-Out:	10 minutes	Disabled	
S2D Time-Out:	8 hours	Disabled	
Smart CPU Mode:	Enabled	Disabled	
Brightness:	Low	High	
Ring/Event Resume:	Enabled		
Alarm Resume:	Enabled		
Display Close:	SUSPEND		
System Switch:	ON/OFF		
Battery Status:	Display		
IntelliSpin:	High Performance		
Primary Password:	Disabled		
Admin Password:	Disabled		
Tab,Shift-Tab change fields ↔ change values Alt-P next Esc exit Alt-B reboot			

Figure B-3. System Setup Screens

Table B-1. System Setup Program Categories

Category	Function
BIOS VERSION	Displays the version number and release date of the BIOS in the computer.
TIME	Resets time on computer's internal clock.
DATE	Resets date on computer's internal calendar.
INTERNAL HARD DRIVE	Displays capacity of computer's hard-disk drive.
DISKETTE DRIVE A	Identifies type of diskette drive installed.
BOOT SPEED	Indicates operating frequency at which computer boots—processor's rated speed or a slower speed for power conservation or speed-sensitive software.
BOOT SEQUENCE	Determines whether computer boots from diskette (if present) or hard-disk drive.
SPEAKER VOLUME	Adjusts volume of computer's speaker or disables speaker. (System beep codes are not affected by this category's setting.)
KEYBOARD CLICK	Determines whether built-in keyboard makes audible clicking sounds. (SPEAKER VOLUME must also be enabled.)
SERIAL PORT	Configures computer's built-in serial port.
INFRARED DATA PORT	Configures computer's built-in IrDA 1.0-compatible communications port.
PARALLEL MODE	Controls whether computer's built-in parallel port is configured as an Enhanced Capability Port, Enhanced Parallel Port, AT-compatible (unidirectional) port, or PS/2-compatible (bidirectional) port.
INTEGRATED TRACKBALL	Enables computer's integrated trackball. Set to DISABLED to connect a serial mouse.
UPPER PC CARD SOCKET or LOWER PC CARD SOCKET	Displays status of PC Card connectors. To conserve power, category may be set to DISABLED if a PC Card is installed but not being used.
MONITOR TOGGLE	Enables <CTRL><ALT><F8> key combination that directs where computer's video image is sent (the built-in display, an external VGA display, or both).

Table B-1. System Setup Program Categories (Continued)

Category	Function
REPLICATOR SCSI	Configures computer for use with Advanced Port Replicator. SCSI drivers will load automatically if a SCSI device is connected.
REPLICATOR NETWORK	Enabling this category and installing is_net.exe utility allow user to configure network drivers for use with Advanced Port Replicator.
RING SPEED	Configures the ring speed for the Advanced Port Replicator.
MICROPROCESSOR	Displays type of microprocessor installed.
SYSTEM MEMORY	Displays amount of system memory.
VIDEO MEMORY	Displays amount of video memory.
EXTERNAL CACHE	Displays amount of external cache memory.
EXPANSION DEVICE	Shows the type of Dell Latitude Advanced Port Replicator that is attached to the computer. There are no user-selectable settings for this option.
SERVICE TAG	Displays computer's five-character service tag number.
ASSET TAG	Displays computer's customer-programmable asset tag. This category only appears if user has entered an asset tag number.
POWER MANAGEMENT	Enables computer's power conservation features.
BATTERY	<p>One of the categories of POWER MANAGEMENT. Set different time-outs for the following options when the computer operates from battery power: DISPLAY TIME-OUT, DISK TIME-OUT, SUSPEND TIME-OUT, S2D TIME-OUT, SMART CPU MODE, and BRIGHTNESS.</p> <p>Changing the BATTERY option takes effect immediately (rebooting is not required)</p>
AC	<p>One of the categories of POWER MANAGEMENT. Set different time-outs for the following options when operating the computer from alternating current (AC) power: DISPLAY TIME-OUT, DISK TIME-OUT, SUSPEND TIME-OUT, S2D TIME-OUT, SMART CPU MODE, and BRIGHTNESS.</p>

Table B-1. System Setup Program Categories (Continued)

Category	Function
DISPLAY TIME-OUT	Determines how long computer operates without detecting I/O activity before display is switched off to conserve battery power. This option should be disabled if software compatibility problems occur.
DISK TIME-OUT	Determines how long hard-disk drive is idle before drive motor turns off to conserve battery power.
SUSPEND TIME-OUT	Determines how long computer is idle before suspend mode is activated.
S2D TIME-OUT	Determines how long computer is idle before suspend-to-disk mode is activated.
SMART CPU MODE	Allows microprocessor to slow down when inactive. If software runs particular slowly, this category should be set to DISABLE .
BRIGHTNESS	Determines the brightness used when running from the battery.
RING/EVENT RESUME	Determines if computer exits suspend mode if an installed modem receives an incoming call.
ALARM RESUME	Determines if computer resumes normal operation from suspend or standby mode if an alarm from RTC is detected.
DISPLAY CLOSE	Indicates whether the computer enters suspend mode when the display is closed or whether only the display is turned off when the display is closed. SUSPEND (the default) indicates the computer is in suspend mode when the display is closed. ACTIVE turns off the display, but does not put the computer into suspend mode.
SYSTEM SWITCH	Determines if power switch serves as a conventional on/off switch, or toggles computer between suspend-to-disk operation and normal operation.
BATTERY STATUS	Displays percentage of charge remaining in battery.

Table B-1. System Setup Program Categories (Continued)

Category	Function
INTELLISPIN	Compensates for unbalanced CDs that cause the computer to vibrate when the CD-ROM drive is in use. Allows use of discs that might otherwise be unreadable. Available for CD-ROM drives with speeds of 6X or higher. HIGH PERFORMANCE (the default), lets the CD-ROM drive run at the highest speed. VARIABLE automatically lowers the CD-ROM's speed to reduce or stop the vibration.
PRIMARY PASSWORD	Displays the current status of the primary password and allows you to assign or change this password.
ADMIN PASSWORD	Displays current status of computer's administrator password security feature. Also used to assign and verify a new administrator password.

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